THE Journal

OF THE AMERICAN DENTAL ASSOCIATION

MAY

1953

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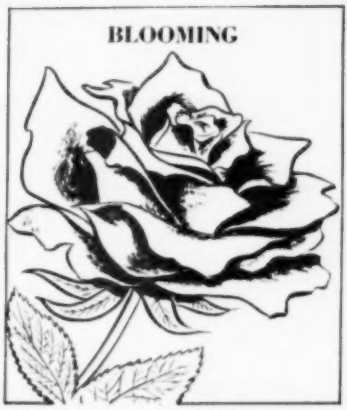

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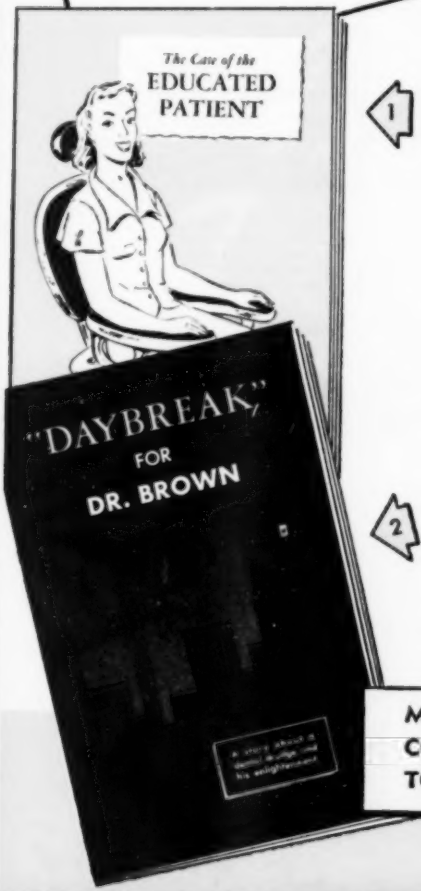

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	Air Only	17°	25°	33°	43°
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	Air-Water Spray	2°	4°	7°	9°

★ Report Published in New York Journal of Dentistry, 22: 147-157 (April) 1952

NOTE: Degrees F. represent temperature rise above initial temperature of operating area. For example, at intermittent operation of 2 seconds cutting and 1 second rest, *without coolant*, a #37 steel bur at 1 lb. pressure and 6000 rpm increases the temperature 78° F. Accepting 90° F. as the initial temperature of the operating area, the cutting operation, therefore, brings the temperature in the tooth structure up to 168° F.

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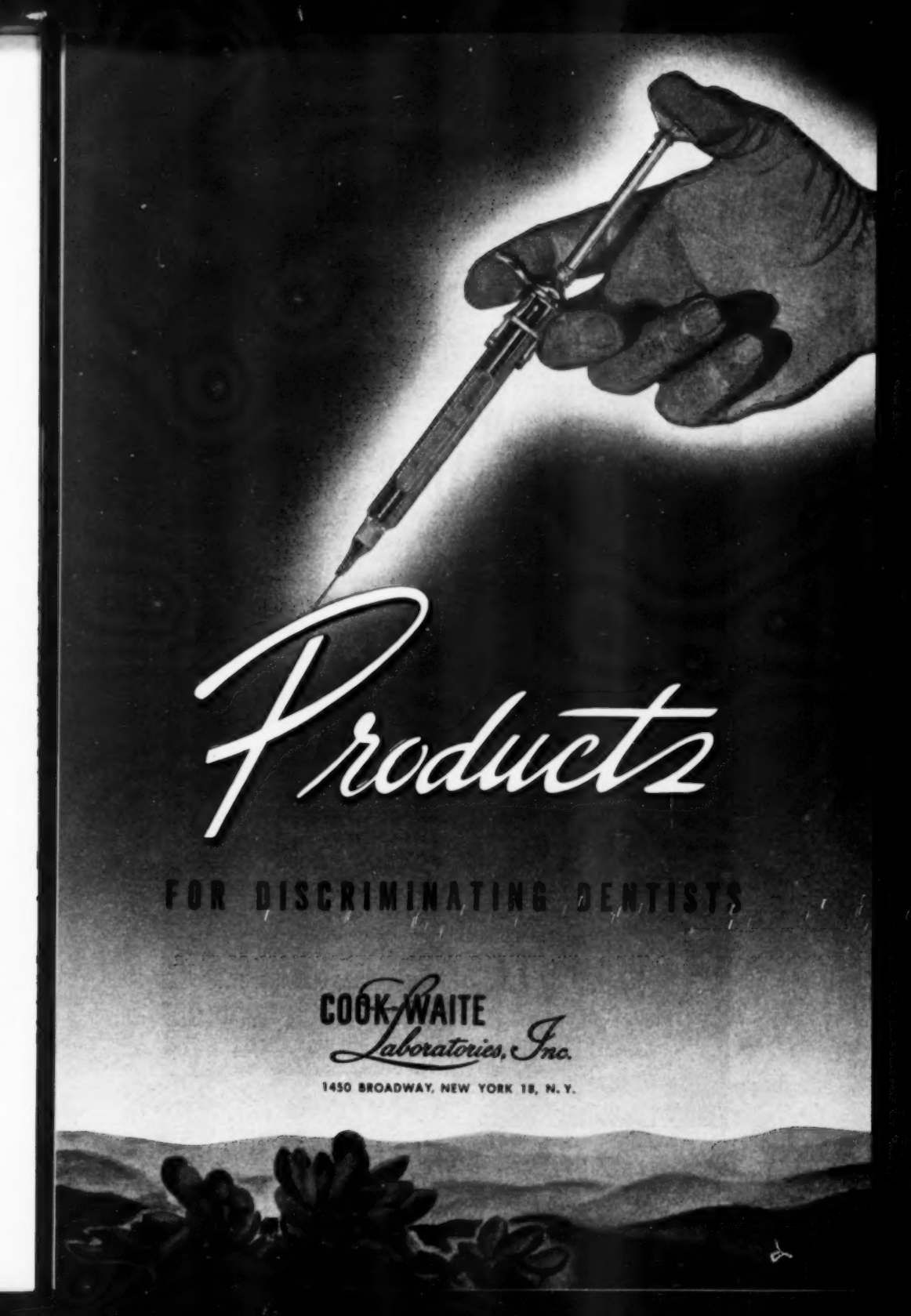
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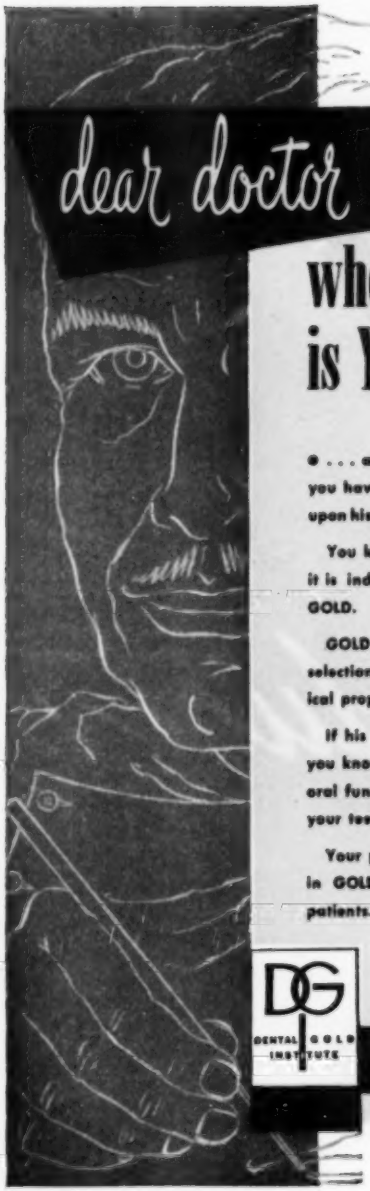

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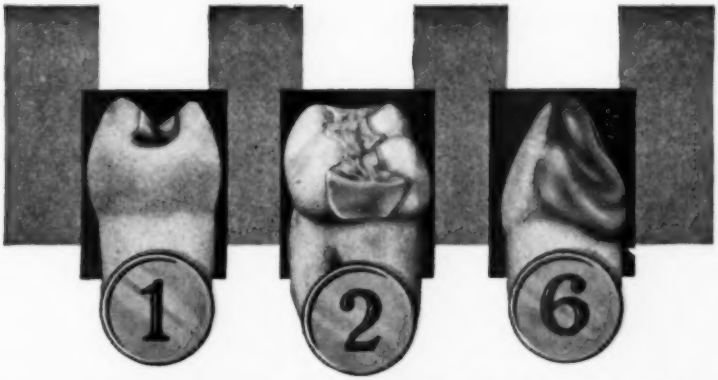

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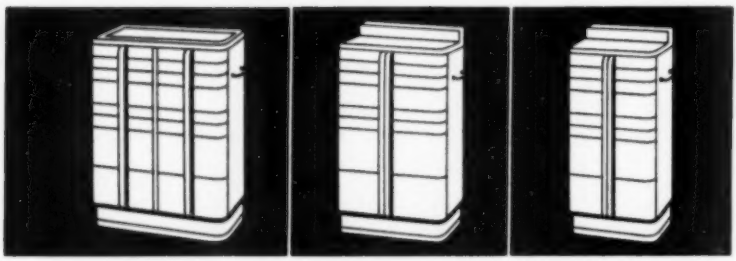

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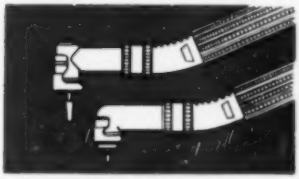

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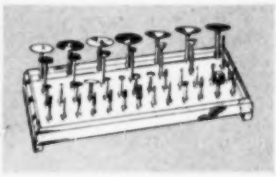

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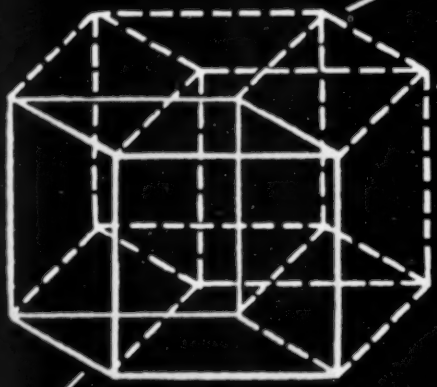

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†Bragdon, C. S. *A Primer of Higher Space, New York, Alfred A. Knopf, 1923, Plate 1.*

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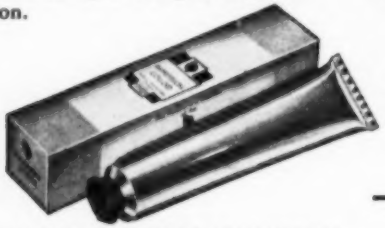

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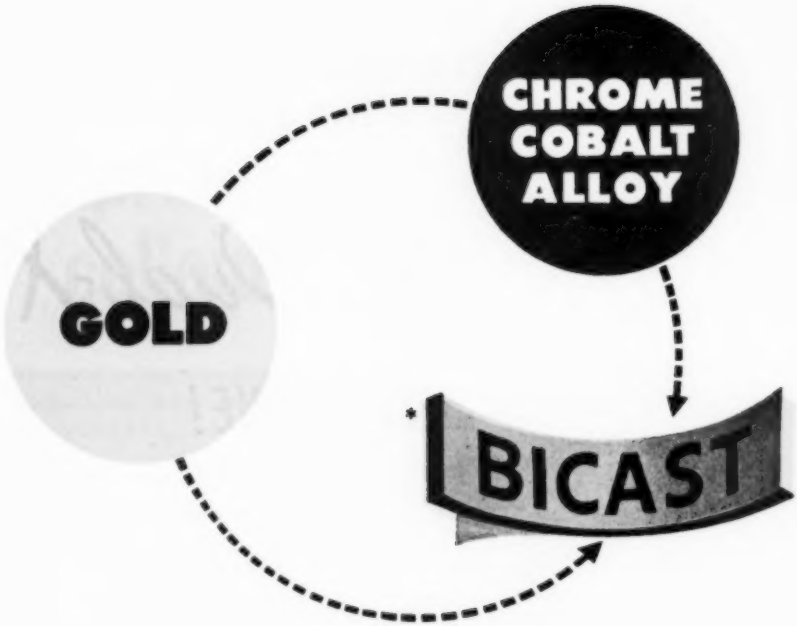

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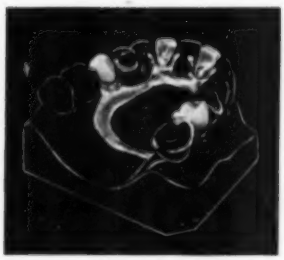

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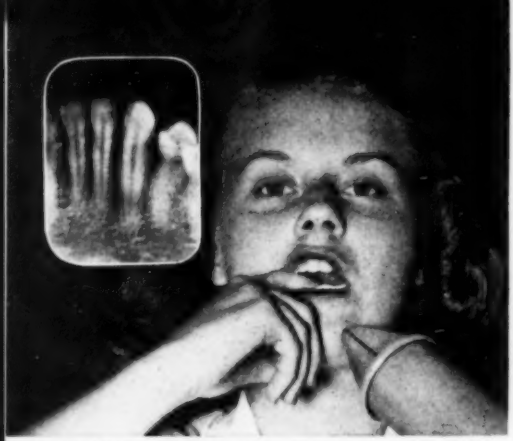

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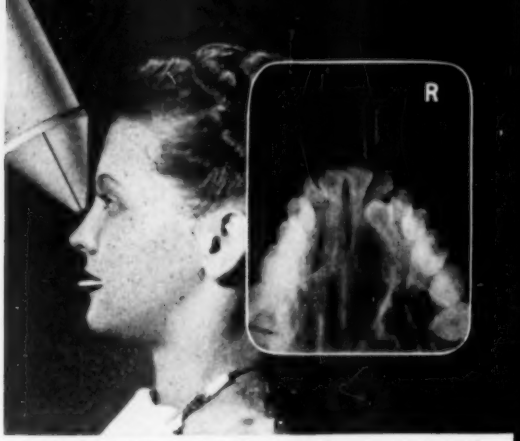

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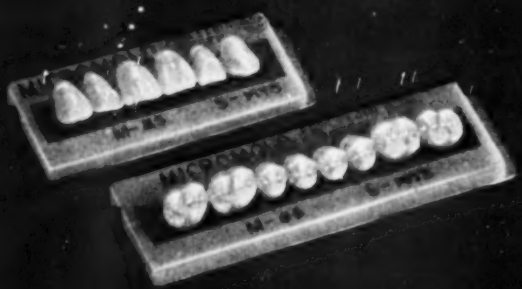

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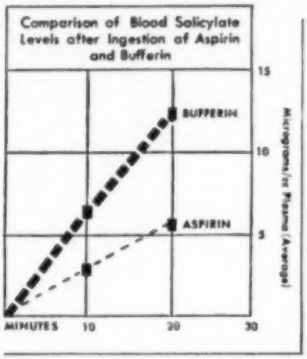

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1. Effect of Buffering Agents on Absorption of Acetylsalicylic Acid. J. Am. Pharm. Assoc., Sc. Ed. 39:21, Jan. 1950
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MAY 1953 VOLUME 46 • NUMBER 5

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Motion picture studies of the mechanism of mastication and swallowing

Harold M. Syrop, D.D.S., Richmond, Va.

A comprehensive review of previous concepts of mastication and swallowing indicates that these concepts have been based mostly on roentgenographic and fluoroscopic findings, indirect observation and personal experience, post-mortem anatomical studies, experiments on animals and extraoral observation of the sequence of movements in chewing and swallowing. This paper describes an endeavor, the first as far as the author knows, to record by means of Kodachrome motion pictures the functioning in a living person of the intraoral organs involved in mastication and swallowing.

MATERIALS AND METHODS

A 24 year old white male was first admitted to the Veterans Administration Hospital, Chamblee, Ga., in 1947 with a diagnosis of chondrosarcoma of the left maxilla with probable antral extension (Fig. 1, left and right). The efforts from 1947 to 1949 to eradicate this tumor and its recurrent growths produced a large opening on the left side of the face. The anatomic parts which were lost included: the maxilla, the orbital ridge, the zygomatic arch, the ascending ramus and a portion of the body of the mandible, slightly more than half of the pterygoid muscles, the buccinator muscle, the orbital contents, a portion of the soft palate, the lateral wall of the nose and vomer, the lateral pterygoid plate, a portion of the sphenoid process, and part of the floor of the anterior cranial fossa. On account of the extension of the tumor superiorly and posteriorly, a portion of

Presented with motion picture at the ninety-second annual session of the American Dental Association, Washington, D. C., October 16 and 18, 1951.

Published with the permission of the chief medical director, department of medicine and surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the author.

Formerly with the Veterans Administration Dental Service; now associate professor of oral diagnosis, School of Dentistry, Medical College of Virginia.

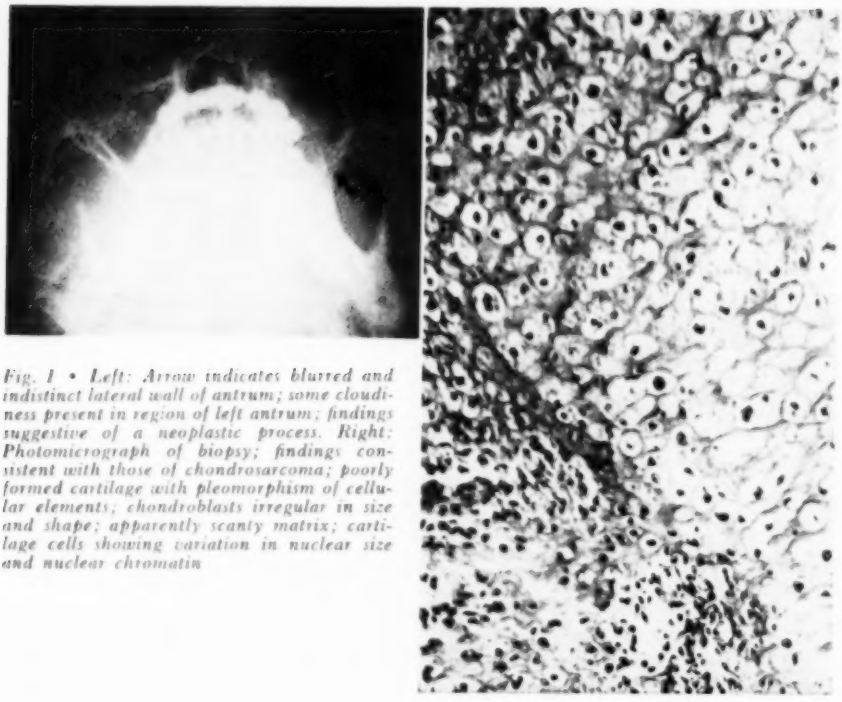


Fig. 1 • Left: Arrow indicates blurred and indistinct lateral wall of antrum; some cloudiness present in region of left antrum; findings suggestive of a neoplastic process. Right: Photomicrograph of biopsy; findings consistent with those of chondrosarcoma; poorly formed cartilage with pleomorphism of cellular elements; chondroblasts irregular in size and shape; apparently scanty matrix; cartilage cells showing variation in nuclear size and nuclear chromatin

the internal carotid artery and the gasserian ganglion with the stumps of the ophthalmic, maxillary and mandibular nerves were sacrificed as well as part of the floor of the middle cerebral fossa. The temporal bone was exposed as far back as its petrous portion (Fig. 2).

In order to gain a better understanding of oral and pharyngeal functions, motion picture studies were made of the movements which could be seen through the facial defect. A clear acrylic prosthetic palate (Fig. 3) was fashioned and anchored to the maxillary teeth on the right side by wire clasp attachments. This appliance permitted unobstructed vision of movements taking place in the mouth during chewing and swallowing and replaced the missing portion of the palate necessary for bolus formation. It was believed at first that a seal for the entire periphery was necessary; therefore, a clear plastic window was sealed at the border around the facial defect (Fig. 4). Through this window direct observation was made of chewing and swallowing during a test meal consisting of various bright-colored foods; namely, yellow squash, bright red tomatoes, white bread, yellow butter, milk and well-browned steak. After initial observation, the test was repeated; and the movements were recorded on normal speed and on slow motion Kodachrome film.

FORMER OBSERVATIONS AND FINDINGS

At the turn of the nineteenth century Richerand[1] in his explanation of masti-

cation declared that there is a slight rise in the superior maxilla as the inferior maxilla is depressed. He was of the opinion that during deglutition the epiglottis is pushed backward and downward by the tongue and exactly covers the laryngeal opening as solid food is passed behind the opening of the larynx.

Several years later, in a detailed, clear-cut fashion Magendie[2,3] gave a standard account of the acts of mastication and swallowing. He divided swallowing into

1. Richerand, A. Elements of physiology. Translated from the French by Robert Kerrison. Philadelphia, Hopkins & Earle, 1808, p. 36, 57-64, 366.
2. Magendie, F. Memoire sur l'usage de l'épiglotte dans la déglutition. . . . Paris, Méquignon-Marvis, 1813.
3. Magendie, F. Précis élémentaire de physiologie, vol. 2. Paris, Méquignon-Marvis, 1817, p. 58-67.

Fig. 2 • Above left: Clinical view of facial defect. Below left: Posterior view showing pillars of fauces, uvula, soft palate, epiglottis and pharynx. Above right: Film showing surgical defect of left side of face, involving floor of orbit, ethmoid sinus, turbinates, vertical ramus of mandible and entire left maxilla. Articulating condyle and styloid process of temporal bone can be distinguished. Below right: Portion of gross pathologic specimens (measured in cm.)

three stages: first, the passage of food from the mouth into the pharynx; second, the passage of food over the glottis and its arrival at the esophagus; third, the passage of food from the esophagus into the stomach. He believed that the first stage of deglutition is voluntary except for the motions associated with the veil of the palate. In a series of experiments, Magendie removed the epiglottis from several animals and found that deglutition was not impeded; he concluded that the epiglottis plays an accessory role in deglutition.

He stated, furthermore, that in patients who have no epiglottis there is no appreciable difference in swallowing except when an eroded tubercular lesion involves the adjacent larynx. He observed that in such cases swallowing without an epiglottis is difficult.

Mosher[4] in 1927, using barium as a tracing material, made a roentgenographic study of tongue and epiglottic movements. He amplified his findings with observations of animals and cadavers. He believed that he had roentgenographic proof of an umbrellalike action of the epiglottis and of the arytenoid approximation to the cushion of the epiglottis. In addition, Mosher recognized the importance of the contiguous movement of the hyoid bone to the upward movement of the tongue. He stated that roentgen-ray plates showed upward movement of the body of the hyoid bone approximately the width of one cervical vertebra. He claimed that the great horns of the hyoid bone are thrust back against the posterior pharyngeal wall and then remain motionless, thereby providing an upward tilt of the body of the hyoid bone.

Barclay[5,6] in 1930 and 1934 recorded the following interpretation of the normal swallowing mechanisms: The raising of the larynx and the backward movement of the tongue, while completely obliterating the pharyngeal space for a fraction of a second, produce a negative pressure in the pharynx. This negative pressure causes the bolus of food to be carried from the back of the tongue downward to a clavicular level. The pharyngeal space is obliterated by the retraction of the tongue and the raising of the larynx.

Barclay mentioned also that the posterior wall of the pharynx does not come forward. He was of the opinion that except for liquids gravitation in the act of swallowing is of minor significance. Subsequent roentgenographic studies by Johnstone[7] do not support Barclay's theories concerning negative pressure or the erect position of the epiglottis during swallowing.

PRINCIPAL PHENOMENA RECORDED IN THE STUDY

The following observations were made in the course of an extensive study of the motion pictures taken through the facial window during the acts of chewing and swallowing.

The ingested food is formed into a bolus and mixed with the saliva through the spatulating action of the tongue. The tongue is able to rotate laterally to a 90° angle by means of the extrinsic muscles (mainly, the genioglossus) and the frenulum linguae. The latter is a vertical fold of the mucous membrane of the tongue and provides for the tongue a modified flexible anchorage to the anterior floor of the mouth.

The tongue rhythmically thrusts food between the occlusal planes of the upper and lower teeth to match the action of the mandible. While so doing, it also impregnates the salivary secretions collected in the anterior floor of the mouth with

4. Mosher, H. P. X-ray study of the movements of the tongue, epiglottis and hyoid bone in swallowing, followed by a discussion of difficulty in swallowing caused by retropharyngeal diverticulum, postcricoid webs and exostoses of cervical vertebrae. Laryngoscope 37:235 April 1927.

5. Barclay, A. E. Normal mechanism of swallowing. Proc. Staff Meet., Mayo Clin. 5:251 Sept. 10, 1930.

6. Barclay, A. E. Mechanics of the digestive tract. Lancet 1:11 Jan. 6, 1934.

7. Johnstone, A. S. A radiological study of deglutition. J. Anat. 77:97 Oct. 1942.

the shredded particles of food. The torn food particles are thereby saturated with the contents, predominantly mucous in character, of the sublingual and submaxillary glands. Thus, the sticky semibolus is formed in the lingual portion of the mouth while the parotid secretions, rich in ptyalin and serous fluid, are incorporated into the bolus through the contraction of the buccinator muscle. This muscle, which forms the outer wall of the oral cavity, shifts the bolus back again between the opposing teeth.

When the tongue determines the proper degree of particle dispersion, the bolus is pushed backward and upward by the tongue against the hard palate. This process is the initial phase of deglutition. The lips close, the teeth are clenched and the tip of the tongue is raised and placed against the anterior portion of the palate with a simultaneous contraction of the anterior pillar of the fauces. This action prevents the food from projecting forward out of the mouth cavity (Fig. 5 series).

At the same time, the nasal cavity is sealed off from the pharynx by the contraction of the posterior pillars of the fauces and the upward and backward elevation of the soft palate and uvula against the upper pharyngeal wall. This procedure apparently dams off the nasal passage to prevent the escape of the bolus via the nasal cavity (Fig. 6 series). Breathing is interrupted briefly. As the bolus is swept backward by the tongue in a sweeping and undulating motion, the hyoid bone is raised upward to provide additional rigidity to the floor of the mouth. The larynx is elevated with the simultaneous rise of the hyoid bone. The sealing off of the respiratory opening, the nasal cavity and the anterior portion of the mouth allows the bolus no other course save that of going backward and downward along an oblique plane.

Observation of the epiglottis in deglutition seems to indicate that because of its intimate relation to the superior constrictor muscle the bolus does not pass over it but goes either to the right or to the left of the epiglottis down through the piriform sinus into the hypopharynx and thence to the esophagus. The epiglottis is fixed to the base of the tongue and moves in conjunction with it. Thus, as the posterior half of the tongue is pushed backward, the distal margins of the epiglottis appear to curl in a semicircular fashion and then to go backward toward the pharyngeal wall. The concave posterior tip of the epiglottis is approximated by a matching convexity of the pharyngeal wall. This action seems to be brought about by the rippling and forward contraction of the pharynx itself, causing intimate contact between the pharyngeal wall and the epiglottis (Fig. 7 series).

In a lateral superior view, the actual backward contact of the epiglottis was somewhat obscured in the motion pictures as the result of closure of the nasal cavity by the uvula and soft palate. Since immediately after the act of swallowing the epiglottis was seen to move forward directly away from the pharyngeal wall, it is assumed that close approximation was made (Fig. 8, left and right). This intimate epiglottic and pharyngeal contact was later verified by personal observation

Fig. 3 • Prosthetic plastic transparent portion of palate

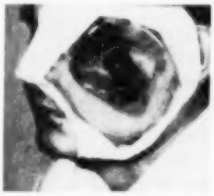


Fig. 4 • Plastic window sealed at periphery of facial defect

of another patient who had both orbit and nasal structures removed with the maxillae remaining intact, so that a direct superior view was provided as swallowing was taking place. By observation from above downward, the posterior margins of the epiglottis could be seen resting tightly against the pharyngeal wall (Fig. 9). In short, the epiglottis by its backward thrust while in a tilted, upright position comes to rest against the superior constrictor muscle and prevents the food from passing over the epiglottis and down the pharynx.

On account of the curved sides of the epiglottis, the bolus veers either to the right or to the left of the epiglottis down to the piriform sinus and from there to the hypopharynx, thereby gaining access to the esophagus. The curling of the end of the epiglottis may be due to the downward pull of the aryepiglottic fold. Accordingly, the epiglottis seems to act as an umbrella to provide complete or almost complete protection over the respiratory opening to prevent excursion of food directly into this passage.

Removal of the outer plastic window seal and the tight suction provided by it made no appreciable difference in the actions of mastication and swallowing. These actions continued equally as well without the plastic window seal. Liquids required little or no tongue manipulation in passing downward to the esophagus. Their passage was rapid and seemed to be influenced directly by the position of the head and by the gravitational factor.

An additional substantiation of the importance of the epiglottis in swallowing was provided for the author when he was called for a consultation at the Veterans Administration Hospital, Bronx, New York, concerning the possibility of the construction of a prosthetic epiglottis to replace one that had been removed with its muscular attachment in the treatment for carcinoma of the epiglottis. After the operation proper swallowing became impossible for this patient because of aspiration of food into the exposed respiratory opening. Since there was no residual epiglottis, it was not possible to fabricate an artificial plastic epiglottis that would move together with the tongue. The patient was a desert prospector, approximately 50 years old, for whom every effort toward re-education in the swallowing process had failed. The patient, tired of continual tube feeding and anxious to return to his occupation, consented to a laryngectomy so that he could dispense with tube feeding. In his vocation, faced with the choice between talking and eating, he preferred the latter. A laryngectomy was performed with an uneventful recovery; once again he was able to eat without resorting to tube feeding.

It is the purpose of this initial report to augment the previous concepts of mastication and swallowing and thereby to stimulate interest in further studies of these mechanisms in human beings. Such studies could be of much practical value, since a large number of patients with Parkinson's disease have moderate to considerable difficulty in chewing and swallowing. This difficulty can be traced to a decrease in salivary secretion and also to the incoordination of the muscles involved in swallowing. Advanced cases often show pulmonary lesions caused by inadvertent aspiration of the oral contents through improper and incoordinated deglutition. Likewise, persons with myasthenia gravis, multiple sclerosis, hypoglossal nerve lesions and Guillain-Barre syndrome (acute infectious polyneuritis) may suffer such complications. A clearer understanding of the functions of chewing and swallowing may aid in decreasing the incidence of pulmonary lesions usually associated with advanced phases of cerebral lesions which affect these processes.

Naffziger, Davis and Bell[8] describe a

8. Naffziger, H. C.; Davis, C., and Bell, H. G. Paralysis of deglutition; surgical correction. Ann. Surg. 128:732 Oct. 1948.

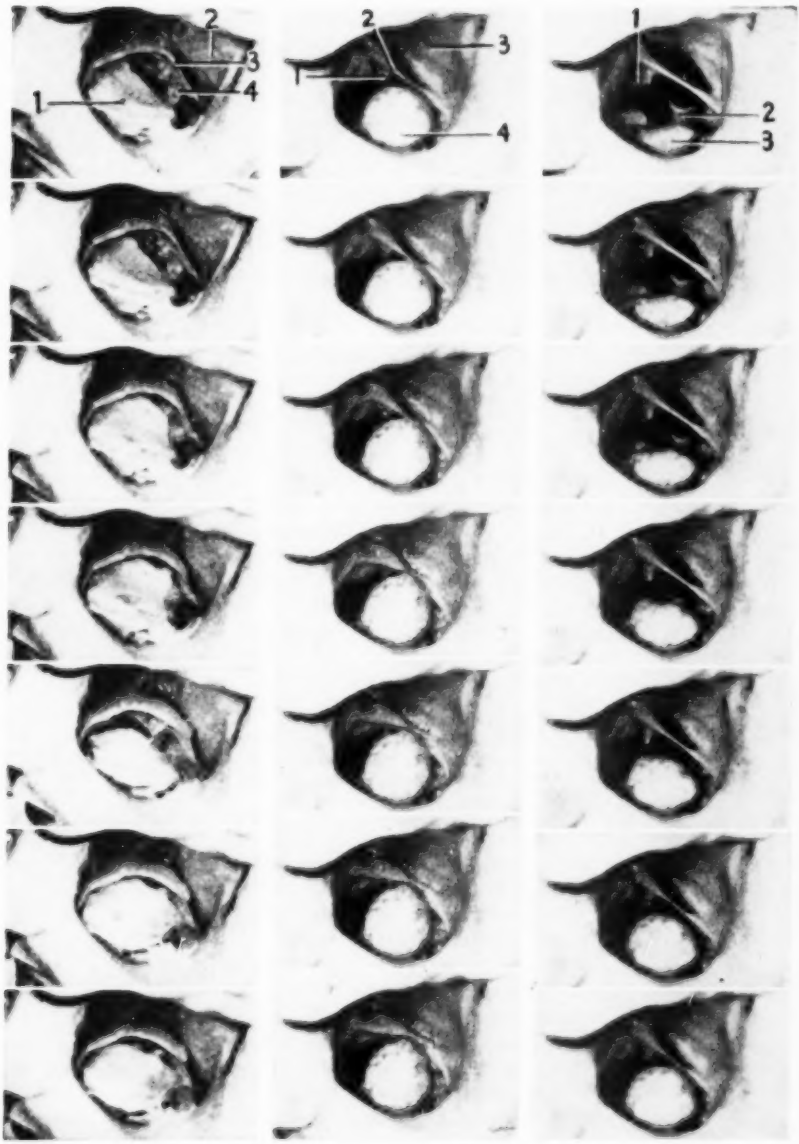


Fig. 5 • Tongue in swallowing; 1, tongue; 2, superior constrictor muscle; 3, soft palate; 4, uvula

Fig. 6 • Sealing off nasal cavity; 1, faucial pillars; 2, soft palate; 3, superior constrictor muscle; 4, tongue

Fig. 7 • Beginning of swallowing: epiglottis moving backward, posterior wall of pharynx rippling forward; 1, faucial pillars; 2, epiglottis; 3, tongue

Fig. 8 • Left: Epiglottis immediately after swallowing; 1, faucial pillars; 2, superior constrictor muscle; 3, epiglottis; 4, tongue

Right: Epiglottis continuing to move away from pharyngeal wall after swallowing; 1, superior constrictor muscle; 2, epiglottis; 3, faucial pillars; 4, tongue

case of a patient who was unable to swallow because of paralysis of the ninth, tenth, eleventh and twelfth nerves after a gunshot wound of the head. Copious amounts of saliva flowed directly down the larynx, causing violent vomiting and coughing. The patient was distraught and almost to the point of suicide from these disturbances. By ingenious surgical manipulation, the digastric muscle was transposed to raise the larynx; and satisfactory swallowing resulted.

Fig. 9 • Anterior facial window permitting direct superior view over maxillae to posterior pharyngeal wall. When patient swallowed, intimate epiglottic contact against pharyngeal wall was seen

ASSOCIATED PHENOMENA RECORDED IN THE STUDY

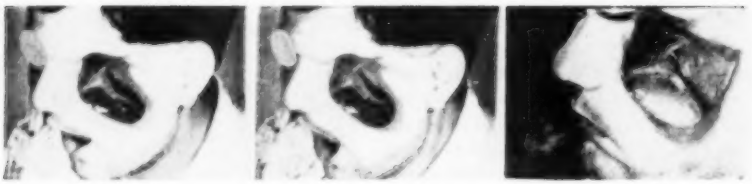
Speech • Speech was recorded in a short oral sequence. The tongue, lips and teeth were seen to act as tempering devices in the formation of consonants and vowels. The position of the tip of the tongue could be observed in various relations to the palate in its anterior, mid-palate and posterior palate positions. The raising of the pillars of the fauces, uvula and soft palate effected the nasal tone, while the lips, teeth and tongue worked in harmony to produce "ph," "p," "s" and "wh" sounds. The nasal pharynx, oropharynx, hard palate and soft palate functioned to modify the vibrated sound produced through the larynx.

The Cough Reflex • An observation of the cough reflex showed that it commences as a deep inspiration followed by a vigorous expiration during which the nasal passage is shut off by the elevation of the soft palate and uvula while the tongue lies flat and expanded. This action appears to facilitate uninterrupted expulsion of air (Fig. 10, left).

Yawning • The act of yawning also was observed. During a self-induced yawn there was a depression of the mandible and a broad opening of the mouth followed by a sharp inspiratory gasp. The tongue was raised slightly, and the anterior and posterior pillars of the fauces were elevated together with the uvula and soft palate (Fig. 10, center).

Smoking • It was the patient's desire that in addition to being provided with an efficient masticatory apparatus his ability to smoke should be restored. In an attempt to evaluate the need for this procedure, a motion picture study was made of smoking. It was observed that without a seal between the cheek and palate, smoking was not possible. Despite the posterior pistonlike effect of the tongue, no smoke could be sucked through a lighted cigarette. With the addition of a plastic palate extending over the left side of the defect almost to the cheek, smoking became possible. The tongue could be seen projecting backward in an arched fashion, creating negative pressure to make smoking possible. Since there was no closed passage through the larynx, pharynx and nasal cavity, however, exhaling through the nose was impossible; the smoke could be seen coming upward and outward through the lips and the lateral facial defect (Fig. 10, right).

The conclusion from these observations is that smoking may be detrimental to a successful surgical closure of oroantral fistulae, since a breakdown of the surgical flap might be caused by tongue manipu-



Coughing Yawning Smoking

Figure 10

lation and by the force of the negative mouth pressure necessary for this habit. After such surgery a high-caloric liquid diet is advisable, since the passage of liquids in swallowing requires little tongue manipulation and therefore involves less danger of flap displacement. A similar postsurgical dietary routine is suggested for patients with a tendency to bleed, since it would minimize clot displacement and reduce the possibility of subsequent hemorrhage.

SUMMARY

A review of the literature indicates that this is the first complete motion picture record of the actions and functions of the human epiglottis during swallowing. By means of this record it is possible to clarify heretofore controversial concepts relating to human physiology.

The motion picture Kodachrome study, which was made through the facial opening of a patient who had lost much of the left side of his face, gave a clear view of the following functions of the organs involved: the role of the strikingly mobile tongue in chewing, swallowing, speaking, yawning, coughing and smoking; coordination of organs in the production of speech; functioning of the cough reflex; act of yawning; process of mastication; bolus formation; mechanism of swallowing, including movements of the epiglottis and the apparent passage of the bolus not over but to either side of the epiglottis.

On the basis of close observation of the organ during function, it seems that the epiglottis provides a diverting, umbrella-like protection or shield to the respiratory passage during swallowing. This action would suggest that some previous theories indicating an ineffectual role of the epiglottis during deglutition are not completely tenable.

Human Needs • The greatest skills we need are not in science or engineering, but in human relations. *Cornelis W. de Kiewiet, "Education for Survival," The Scientific Monthly 76:61 February 1953.*

Indications for the use of plastic resins in crown and bridge prosthesis

Douglas H. Yock, D.D.S., Minneapolis

Studies on the physical properties and on the chemistry of polymerization of the plastic resins have been reported.[1-3] Practical research is being done in order to determine the place of the plastic resins in the over-all practice of dentistry. It is the purpose of this paper to evaluate the practical use of the plastic resins in the field of crown and bridge prosthesis.

The plastic resins have been used in innumerable crown and bridge restorations. In many instances they seemingly are serving satisfactorily. Likewise, in many instances they have not been satisfactory, either esthetically or functionally. An explanation for the apparent failures can be found most often in the physical properties; in other words, the possibilities for a successful plastic restoration have been exceeded.

Plastic resins are indicated for use in crown and bridge prosthesis for esthetic reasons. They have been accepted for several operations because it is easier to produce a satisfactory esthetic result with them than it is to fire a porcelain piece or to contour and reglaze a prefabricated porcelain facing. Dentists are not as familiar with the handling of porcelain as they are with wax manipulation. The carving of crowns, inlays and pontics in wax to reproduce good anatomic tooth form is comparatively easy. The fact that the use of the plastic resins in crown and bridge prostheses requires a reproduction of anatomic form entirely in wax followed by a cutting out of that portion which is to be filled with the plastic resin usually insures good anatomic form to the restoration.

The success of the plastic resins esthetically in crown and bridge restorations is dependent on the bulk of the plastic resin used in a particular restoration. Not only must there be bulk in the body of the plastic portion of the restoration, but this bulk must be continued to the margins. This is true whether it is bulk of resin to the shoulder of an acrylic jacket crown restoration or to the margin of a buccal cut-out for a full gold crown. This is illustrated diagrammatically in Figure 1. The diagram explains to a large degree the reasonably successful and the unsuccessful esthetic use of the plastic resins in crown and bridge prosthesis.

The hypothetical cavity simulating a labial or buccal cut-out is filled with a plastic resin. The angle **A-A-C** is pre-

Presented before the Section on Partial Prosthodontics, ninety-third annual session, American Dental Association, St. Louis, September 9, 1952.

Professor of crown and bridge prosthesis, School of Dentistry, University of Minnesota.

1. Souder, Wilmer, and Paffenbarger, G. C. Physical properties of dental materials. Circular 433 of the National Bureau of Standards. Washington, D. C., Government Printing Office, 1942, p. 13.

2. Tylman, S. D., and Peyton, F. A. Acrylics and other dental resins. Philadelphia, J. B. Lippincott Co., p. 39-133.

3. Schwartz, J. R. The acrylic plastics in dentistry. Brooklyn, Dental Items of Interest Publishing Co., Inc., 1950, p. 64-106.

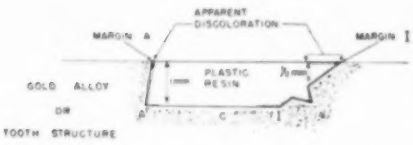


Fig. 1 • The box-form and the beveled type of cavity. Bulk of plastic resin to margin is necessary for esthetic reasons

pared as a cut-out of an acute angle not less than 1 mm. in depth. It could be described as a "box-form" or "amalgam-like" preparation. A plastic resin insert in a pontic or full crown with a labial or buccal cut-out, prepared in such a manner to a depth of at least 1 mm., will remain esthetically satisfactory for many years. A noticeable, but not particularly objectionable, darkened marginal line will appear at margin A in a matter of months after the insertion of the plastic resin.

In the hypothetical cut-out (Fig. 1) filled with a plastic resin, the angle I-I-C is an obtuse angle. This cut-out for the plastic resin is in the form of a bevel such as might be made inadvertently by laying back the mesial margin of the buccal cut-out of a bicuspid full crown to prevent the display of gold. It is not box-formed but is analogous to an inlay cavity with a long axial wall bevel. Plastic resin placed in such a cut-out, where the actual depth of plastic resin thins out to the margin, will become esthetically unsatisfactory more rapidly than will the plastic resin placed in a cavity which is acute and has bulk of plastic resin to the margin.

The bluish discoloration or darkened marginal line will be noticeable at both margin A and I after the same number of months. In the years following, because the plastic resin to margin I is thin or beveled to the margin, the discoloration at margin I will progress much more rapidly than at margin A. This progressively unesthetic discoloration at margin I gives the appearance of penetration of stain in the body of the plastic resin. Although penetration of stain into the resin itself is a factor, it is almost negligible, as evidenced by the reasonably esthetic appearance of margin A after several years. This marginal discoloration undoubtedly is caused by the fluid percolation in the space between the walls of the plastic resin and the gold cut-out or tooth structure.[4] The fluid percolation carries minute particles of debris into the marginal spaces and the adjacent pores of the plastic resin. This marginal discoloration through the plastic resin can be seen to a considerable depth in a beveled restoration. The surface appearance of a considerably wider area of discoloration is the result of the beveled cut-out and the resulting thin layer of plastic resin. Comparatively, with nonbeveled box-form plastic resin restorations, the depth of the penetration of the debris cannot be seen.

Careful attention to the simple principle of properly preparing the recess in which the plastic resin is used will insure a practical, esthetically acceptable result. Bulky butt joints are the rule when the plastic resin is used against tooth structure as in an acrylic resin jacket restoration or in the labial or buccal cut-out of a crown or pontic.

CARIES PROGNOSIS

Thus far the plastic resins with relation to a satisfactory esthetic result have been considered. The possibility of failure of the crown restoration because of caries in the supporting tooth structure also must be considered. Percolation of fluids and accompanying debris in the space between plastic resin and tooth structure

4. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

can contribute to the occurrence of caries. It is advisable, therefore, in the labial or buccal cut-out of a full gold crown prepared to receive a plastic resin, to have a complete casting protect the tooth. This gold protection may be thin but it should not be perforated.

ANTERIOR FULL VENEER CROWN RESTORATIONS

In the selection of a material for use in the construction of a full veneer crown for an anterior restoration, there is a choice between plastic resin or fired porcelain. Dental practitioners are familiar with the advantages and disadvantages of a porcelain jacket crown. The acrylic resin jacket crown is not as familiar. Because of the previously mentioned factors of marginal discoloration, fluid percolation and debris accumulation, plus the questionable color stability of the plastic resin, it would seem logical at this stage in the development of the plastic resins to use fired porcelain for a full veneer crown. In those instances where occlusion is such as to contraindicate the porcelain full veneer crown, the cast gold alloy crown with the plastic resin labial insert would be practical.

PLASTIC RESINS IN PONTICS

A relatively successful use of plastic resin is in conjunction with the gold alloy in posterior pontic construction. The physical properties of the plastic resin are such that the resin cannot withstand abrasion and attrition. It would be advisable, therefore, to construct the occlusal or incisal edges of pontics with a casting protection of gold alloy which will accommodate stresses and wear of mastication.

The opposition of pontics to the mucosa of the ridges is an important consideration in pontic construction. The contacting surface of the pontic should be as small in area as is consistent with good anatomic form and should be made of a material which is tolerated by the mucosa. Thoroughly polymerized, highly polished plastic resin is such a material. It has been observed clinically, however, that debris adheres to plastic resins at the gingival contacting surface of the plastic resin pontic. This may be due to minute surface porosity. This calculuslike accumulation is irritating to the tissues, and it is not easy for the patient or dentist to remove it from the plastic resin pontic (Fig. 2).

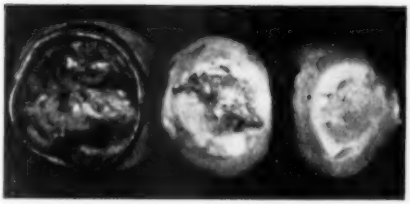


Fig. 2 • Adhesion of calculuslike debris at the gingival contacting surface of a plastic resin pontic

Highly polished gold is less likely to accumulate debris, is tolerated by the mucosa and is relatively easy to keep clean. For this reason, it would be advisable, therefore, that the gingival adaptation of the pontic to the mucosa be constructed of a gold alloy. The plastic resin is used as the esthetic insert into the labial or buccal box-formed cut-out. It can be prepared well into the body of the pontic so as to save gold alloy and insure satisfactory appearance because of the ample bulk of the plastic resin insert. To sum up the considerations in regard to pontic construction—the occlusal and gingival surface inserts should be of gold and the plastic resin should be used only for the buccal insert.

PLASTIC RESIN DOWEL CROWN

Plastic resin is practicable in the construction of a dowel crown. Fractured or badly decayed teeth with successful root

canal fillings can be restored adequately. The plastic resin is processed over a dowel which is long enough for anchorage in the prepared root canal. The dowel also must be sufficiently long and wide to support the body of the plastic resin crown. A thin band and cap of gold alloy, fitted to the preparation, is advisable to eliminate direct contact of the plastic resin to tooth structure. The bulk of plastic resin, which may be used in reproducing an entire crown, insures satisfactory esthetics. The plastic resin dowel crown is subject to the effects of abrasion and attrition.

ABUTMENT PREPARATION

The technic for the preparation of the abutment tooth for a full crown retainer with a labial or buccal plastic resin insert (Fig. 3) is as follows:

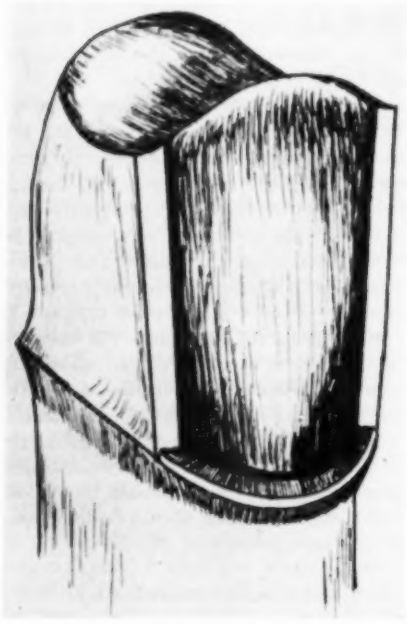


Fig. 3 • The preparation of an abutment tooth for a full crown with a plastic resin buccal insert

The abutment tooth is prepared in a manner similar to that used in the routine procedure for a three-quarter crown. The only significant difference is that both the mesial and distal grooves are placed farther labially or buccally than in the average three-quarter crown preparation. The distal groove is placed farther labially than the mesial groove. After the three-quarter crown part of the preparation is complete, the second step is the reduction of the labial or buccal tooth structure. This reduction is made in the same way that the reduction is made in a jacket crown preparation, with a generous but even reduction of tooth structure. A shoulder preparation is established connecting the labially placed mesial and distal grooves. This shoulder is placed gingivally one half the distance between the crest of the free gingival tissue and the periodontal attachment. The cavosurface margin of the shoulder preparation is beveled in the same manner as in the gingival seat of an inlay preparation.

A shoulder-type preparation on the labial or buccal aspect insures maximum bulk to the gingival ribbon casting and provides bulk for a good box-form cutout for the plastic resin at the gingival margin. The shoulder part of the preparation may be modified to a chamfered type of margin but it should be a heavy chamfer. Enough bulk of tooth structure must be removed from the labial or buccal surface of the abutment preparation to provide for the thickness necessary for an esthetic plastic insert and the thin labial or buccal area of the crown casting. This should never be less than 1 mm.

ADDITIONAL USES FOR PLASTIC RESIN

Resins should be considered for the unorthodox case where there is an extremely difficult esthetic problem but where there are sufficient teeth present to

serve as bridge abutments. Many esthetic problems caused by diastemas, rotated teeth, malalignment and partially erupted teeth, for example, can be solved by fabricating a bridge which requires more than the conservative amount of plastic resin in its construction. In these unusual instances, the less conservative use of plastic resin is justified, although the restoration will need surveillance and may need to be remade occasionally. There are also instances where the patient demands an esthetic appearance and the operator feels justified in exceeding the conservative use of the plastic resin. This might be true in the repair or construction of an anterior bridge where plastic resin is used as a complete veneer supported by cast retainer copings attached to an ample gold alloy pontic framework.

SUMMARY

1. Plastic resins are indicated for use in crown and bridge prosthesis because of their esthetic possibilities and the ease of manipulation.

2. The success of the plastic resin esthetically is dependent on continuing the bulk of the plastic resin to the margin.

3. Properly prepared recesses in which the plastic resin is to be used will insure a practical, esthetically acceptable result. Bulky butt joints are the rule when plastic resins are used in the labial or buccal cut-out of a crown or pontic.

Because of the physical properties of the plastic resins and for practical clinical reasons, conservative use of the plastic resins is recommended in the best interests of good dental treatment.

The Dilemma of Analysis and Synthesis • We have inherited from our forefathers the keen longing for unified, all-embracing knowledge. The very name given to the highest institutions of learning reminds us, that from antiquity and throughout many centuries the universal aspect has been the only one to be given full credit. But the spread, both in width and depth, of the multifarious branches of knowledge during the last hundred years has confronted us with a queer dilemma. We feel clearly that we are only now beginning to acquire reliable material for welding together the sum total of all that is known into a whole; but, on the other hand, it has become next to impossible for a single mind fully to command more than a small specialized portion of it.

I can see no other escape from this dilemma (lest our true aim be lost forever) than that some of us should venture to embark on a synthesis of facts and theories, albeit with second-hand and incomplete knowledge of some of them—and at the risk of making fools of ourselves. *Schrödinger (1945).*

A systematic method of designing upper partial denture bases

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A removable partial denture may derive its support from the two remaining structures in a partially edentulous mouth—the remaining natural teeth and the residual alveolar ridges. There is considerable disagreement as to the optimum method of utilizing the remaining natural teeth as supports for a partial denture. Some desire abutment teeth to take a considerable amount of masticatory stress and attain this end by the use of rests, rigid sections of clasps and rigid connections between clasps and saddles. Others wish the abutment teeth to take a lesser degree of masticatory stress and accomplish this by the use of stress-breakers, a flexible connection between clasps and saddles. And finally a small group wish the remaining natural teeth to take little or no masticatory stress and accomplish this by means of highly flexible clasps without rests.[1]

Although this difference of opinion exists as to how remaining natural teeth may be used as a support for a partial denture, there is closer agreement as to the method of utilizing residual alveolar ridges for this purpose.

The residual alveolar ridges can be used safely as a partial denture support provided two considerations are kept in mind. The first is that there is a definite limit to which alveolar ridges can accept masticatory stresses without undergoing morphological changes. If stresses are below this physiological tolerance point, there will be no disturbance in the equilibrium of bone deposition by osteoblasts and bone resorption by osteoclasts. If stresses exceed this physiological tolerance point, however, the equilibrium is disturbed and osteoclastic action becomes predominant, resulting in bone resorption. The physiological tolerance point varies with different patients and is controlled by systemic factors. As Glickman[2] states:

> The constantly present systemic regulation of alveolar bone constitutes the "bone factor" which is a fundamental consideration in the construction of all dental prosthesis because it governs the capacity of alveolar bone to adapt itself to functional demands. Old age, malnutrition and postmenopausal changes are examples of common systemic conditions which, because they inhibit the individual formative capacity of bone, favor atrophic changes in bone throughout the skeletal system and thereby have a direct bearing on the capacity of alveolar bone to withstand external forces. Not only does the bone factor regulate the cellular activity which makes it possible for alveolar bone to accommodate existing functional requirements but it also determines the adaptive capacity of alveolar bone to increased functional demands.

The second consideration in using alveolar ridges as a partial denture sup-

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1. Steffel, V. L. Fundamental principles involved in partial denture design. J.A.D.A. 42:534 May 1951.

2. Glickman, I. The periodontal structures and removable partial denture prosthesis. J.A.D.A. 37:311 Sept. 1948.

port is stress control. To eliminate any possibility of exceeding the physiological tolerance point, stresses that eventually are transmitted to each unit of alveolar ridge bearing area should be kept at a minimal level. All procedures that contribute to this end should be incorporated in base design. Such procedures are stress control at its area of origin, the occluding platform, and at its area of termination, the ridge contacting surface.

Stresses originating from the occluding platform can be kept at a minimum by correct positioning of artificial teeth over the crest of the ridge, narrow buccolingual widths, minimum anteroposterior length commensurate with function, reduced cusp inclines, sharp cutting cusps with ample sluiceways, and a harmonious balanced occlusion.

If the above means are utilized in establishing occluding contacts, the stresses culminating on the alveolar ridges will be at a reduced level. This reduced level may still be an overloading force, however, unless it is distributed over as wide an area as possible. To get the desired distribution of stresses, a partial denture base should have a maximum tissue contact area. All possible bearing area should be included in the outline of the base. The stress to each unit of bearing area is thereby kept at its lowest possible level, and tissue overload with its resultant bone changes is avoided.

COMPONENTS OF A PARTIAL DENTURE BASE

The base of a partial denture consists of saddles and connecting bar or bars. The saddles carry the occluding artificial teeth and contact the alveolar ridges from which they derive their support and to which they transmit the stresses of occlusion. The connecting bar or bars joins the various saddles so that a functional unit is formed from separated parts. Both of these partial denture base components must perform certain functions and must be designed so that these functions are fulfilled. The functions of a partial denture saddle are (1) to carry the replaced teeth, (2) to transmit the forces of occlusion, both vertical and horizontal, to the underlying alveolar ridges and (3) to restore lost bony and gingival contours. To fulfill these functions, saddles of partial dentures should have a maximum coverage of all available bearing area. Buccally and lingually, the flanges of a partial denture saddle should be extended to the limits of the mucobuccal and mucolingual folds in function. Posteriorly, upper free end saddles should include the tuberosities and end in the pyterygomaxillary notches. Lower free end saddles should cover the retromolar tubercles or "pear shaped areas."

Occasionally, variations from full buccal or labial extensions may be justified. In an anterior saddle replacement, where full ridges are present and the patient has a high lip line, the labial flange of the saddle may be eliminated and the artificial teeth butted directly to the ridge for esthetic reasons. Another instance where full buccal extension may be deviated from is in one tooth saddles where full buccal extension may create a weak buccal flange that is prone to fracture. And a final instance is where buccal undercuts interfere with the path of insertion of clasps, necessitating a reduced buccal extension.

Connecting bars or major connectors have two functions in a partial denture base, saddle connection and stress transmission. Not only must they connect isolated saddles to form a functional unit, but they must be the means of distributing stresses applied to one saddle to all other saddles of the partial denture base. This is a highly important requisite of any connecting bar as it is in keeping with the basic concept of keeping masticatory stresses transmitted to alveolar ridges at an absolute minimum and thereby avoid exceeding the physiological tolerance point of the bone. A connecting

bar can only perform the function of stress transmission if it is rigid. Without this necessary rigidity, a masticatory load applied to the occluding platform of a constituent saddle will cause the connecting bar to flex, which results in most of the load being placed on the ridge directly under the saddle. The degree of flexibility of the connecting bar is the decisive factor in whether little or none of the stress will be transmitted to the other saddles and their underlying ridges. An insufficiently rigid bar may result in an overloading of the alveolar ridge, exceeding its physiological tolerance point with resulting osteoclastic action and clinical resorption. To avoid this unwanted sequence of events it is necessary that connecting bars have maximum rigidity. Thereby masticatory stress applied to a saddle will not be taken up entirely by its underlying ridge, but will be transmitted by means of rigid connecting bars to all other saddles of the base and their underlying ridges (Fig. 1).

A second requisite of a properly designed connecting bar is that in joining isolated saddles, it should avoid contact with resistant nonbearing areas of the jaws. This is especially true for connecting bars of upper partial dentures. A final requisite of a connecting bar is that it be as small and as innocuous as is possible, commensurate with correct function.

In the lower jaw, the design and construction of a connecting bar, or the commonly called lingual bar, presents little difficulty. To make it least detectable to the tongue, its inferior border should be placed at the lowest level of the mucolingual fold in function. Its contact with the lingual mucosa is determined by the inclination of the lingual surface of the alveolar process of remaining natural teeth that the bar traverses. A lingual inclination permits passive contact; a vertical position requires a slight amount of relief and a labial inclination requires a greater degree of relief. Lingual bars should be constructed of materials and in suitable dimensions to assure their unqualified rigidity.

THE UPPER PARTIAL DENTURE BASE

In the upper jaw, the design of the saddles and connecting bars which together form the upper partial denture base is not as simple a matter as in the lower jaw. Various anatomic structures and landmarks are present that must be taken into consideration. The method of handling these structures determines the final design of the partial denture base and is responsible for the wide variations in design that exist. Whereas in a lower partial denture base, saddles and connecting bars can be designed independently and slight variations have little effect on the ultimate design, the same does not hold for an upper base. There is a closer interdependence of saddles and bars in the upper base and slight variations may have a considerable effect on the final design.

In saddle design, the upper buccal flange is carried as high into the mucobuccal fold as the musculature in function will tolerate without causing displacement or irritation. A problem arises as to the ideal limit of extension of the palatal flange of an upper partial denture saddle. A complete denture furnishes no guide. Although upper complete dentures have palatal flanges that cover the alveolar ridges, they do not end in borders but are joined to one another by the coverage of the structures of the roof of the mouth.

To determine the most advantageous area of termination of the palatal flange of an upper saddle, it is necessary to refer to the underlying histologic structure of the roof of the mouth. A microscopic study of cross sections of the upper jaw (Fig. 2) reveals that[3]

3. Pendleton, E. C. The minute anatomy of the denture bearing area. J.A.D.A. 21:488 March 1934.

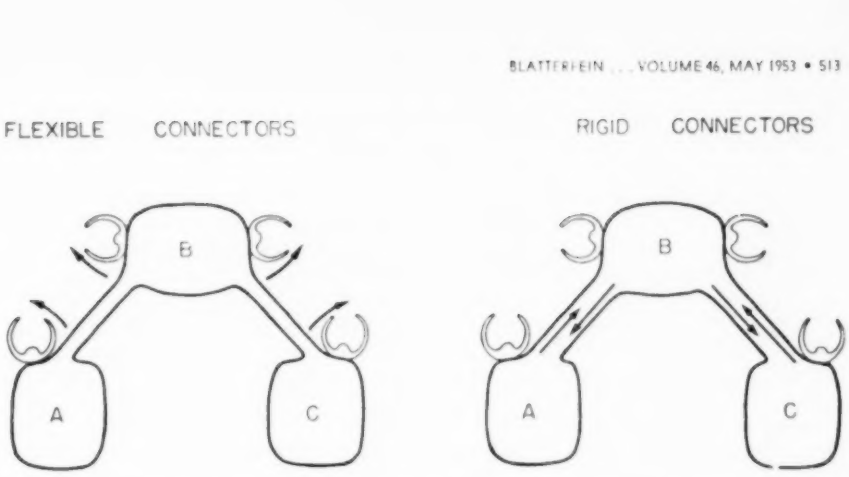

Fig. 1 • Comparison of stress transmission by flexible and rigid connecting bars. Left: With flexible connectors, a masticatory load applied to either saddle A, B or C will cause the bar connecting them to flex and most of the load will be transmitted only to the ridge underlying the saddle to which the load is applied. Right: With rigid connectors, a masticatory load applied to any of the saddles is transmitted through the rigid bars to saddles A, B and C and their underlying ridges

Adipose or fat tissue is found in the hard palate lying in two symmetrical fields that are bounded laterally by the residual alveolar ridge and medially by the ridge of the intermaxillary suture. It occupies an area extending from the incisive foramen to a frontal plane in the region of the first molar tooth. It is present in the entire space between the periosteum and the mucosa. In the region posterior to the first molar tooth, the adipose tissue is progressively less abundant and mucous glands occupy its place in the lining of the soft palate.

These "two symmetrical fields" running anteroposteriorly and containing resilient pads of adipose and glandular tissue are ideal areas for the termination of the borders of the palatal flanges of upper saddles. They permit complete coverage of the residual alveolar ridge and allow for a maximum of lateral force transmission. Terminating borders in these fields of resilient tissue will permit them to move slightly, either in function or after the settling of a free end saddle, without causing any irritation.

Clinically these fields can be palpated and will be found to be located at the definite angle in the upper jaw that is formed by the intersection of the horizontal plane of the roof of the mouth and the inclined plane of the palatal surface of the alveolar ridge (Fig. 3). This angle of intersection can be located easily on the vast majority of casts of upper jaws. If upper partial denture saddles are carried to this angle palatally, one of the chief causes of wide variation in base design will be eliminated.

Another reason for startling variations in upper partial denture base design is the consideration and management of nonbearing areas of the upper jaw. There are three areas in the upper jaw that may be considered nonbearing as applied to upper partial denture bases. The first is the lingual gingival tissues immediately adjacent to the necks of the remaining teeth. If connecting bars are brought too close to the necks of remaining natural teeth, the circulation of the marginal gingival tissues is interfered with and pathological manifestations result. The tissues so involved become inflamed and edematous and eventually severe damage to underlying periodontal structures follows. To prevent these undesirable possibilities, connecting bars

should be kept at least 5 mm. away from the necks of remaining teeth.

A second nonbearing area of the upper jaw to be avoided in the placement of connecting bars is the torus palatinus or "hard area." A connecting bar traversing the torus palatinus will cause irritation during function or after the settling of free end saddles. A connecting bar so placed could be tolerated only if a slight space or relief is created between the bar and soft tissue. Such a space would encourage food collection, would be annoying to the tongue and might interfere with phonetics and speech.

The final nonbearing area to be considered in the upper jaw for connecting bar placement is the movable tissue of the soft palate. The same factors which determine the posterior limit of a complete denture must be considered in the design of connecting bars. They must never be carried posterior to the vibrating line of the palate. Failure to observe this will result in tissue irritation or dislodgment of the partial denture.

PROCEDURE FOR UPPER BASE DESIGN

With these concepts in mind, it is possible to follow an orderly procedure for designing upper partial denture bases. This procedure can be applied to any problem in upper base design and will provide an upper partial denture base that will function efficiently, minimize tissue changes, avoid interference with speech and provide maximum mouth comfort. The procedure consists of five steps and for their description, the partially edentulous mouth shown in Figure 4 will be used. The design of the other components of a partial denture, clasps and rests that utilize the natural teeth as supports, are not shown for simplicity of presentation.

Step 1—Outline of Primary Bearing Areas • The first step is to outline the primary bearing areas or saddles. In the cast under consideration they are three in number. Buccally they are extended to the limit of the mucobuccal fold in function. An exception may be made of the left bicuspid saddle if esthetics, ridge fullness or undercuts indicate the reduction or elimination of the buccal flange. Palatally, the saddles are extended to the angle of intersection of the horizontal plane of the roof of the mouth and the inclined plane of the palatal surface of the alveolar ridge. At this angle are found areas of resilient adipose and glandular tissues. Figure 5, left, depicts Step 1.

Step 2—Outline of Nonbearing Areas • It is necessary to avoid coverage of nonbearing areas for the reasons previously mentioned. The lingual gingival tissues within 5 mm. of all seven remaining teeth, the torus palatinus and tissues posterior to the vibrating line of the palate fall into this category (Fig. 5, center).

Step 3—Outline of Bar Areas • With the completion of Steps 1 and 2, the outline of areas of the mouth that can be covered by connecting bars is established. Any part of the upper jaw that does not fall into the category of a primary bearing area or a nonbearing area is available for coverage by a connecting bar and constitutes the bar areas of the upper jaw (Fig. 5, right). Any type of connecting bar, provided it is confined to the available bar areas, will be acceptable. In upper partial dentures, three types of connecting bars may be used to join the various saddles of the base. They are the anterior bar or horseshoe, the posterior bar and the double bar. Although in some cases each of the above bar types will function efficiently, such wide latitude of selection of connecting bars is not possible routinely. In most instances, one bar type will offer a definite advantage over the others and its correct selection is necessary for an optimum design.

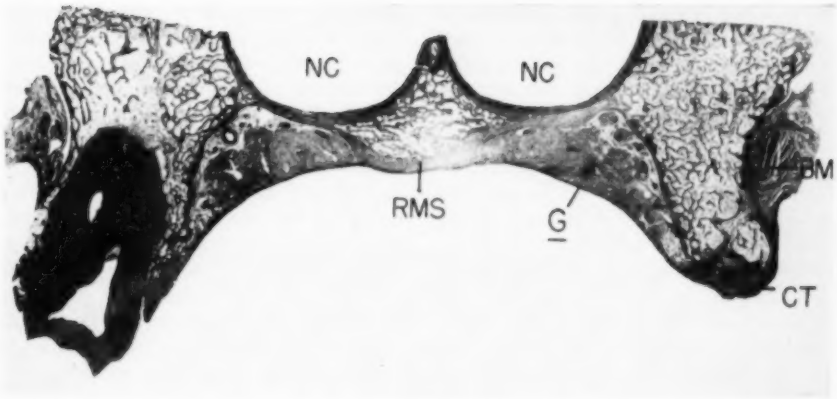

Fig. 2 • Frontal section through upper jaw in third molar region. NC, nasal cavity; BM, buccinator muscle; CT, fibrous connective tissue; G, mucous glands; RMS, ridge of maxillary suture. (Courtesy E. C. Pendleton)

Step 4—Selection of Bar Type • To select the type of connecting bar for a partial denture base, four factors must be considered. They are mouth comfort, rigidity, saddle location and indirect retention.

The factor of mouth comfort should always be foremost in mind in the selection of a connecting bar. It should be of minimum bulk and positioned so as to be least detectable during speech and mastication. The bar type that most closely approximates this ideal is the posterior bar. Properly positioned, it is posterior to the torus palatinus yet anterior to the movable tissue of the palate. It is unnoticeable to the tongue during speech and mastication. A definite effort by the patient is necessary to place the tongue in a position to detect its location. When conditions permit, the posterior bar is the preferred type of connecting bar design. In many instances, however, conditions are present that militate against its use for the fulfillment of maximum function. These conditions are inability to attain sufficient rigidity because of palate size and contour, saddles located in the anterior region of the mouth and free end saddle partial dentures that require indirect retention.

The second factor to consider in deciding which bar type is indicated in base design is rigidity. Connecting bars must have a maximum of rigidity to function as efficient stress transmitters. Possible flexing of bars must be avoided to prevent ridge overload with resulting resorption and soreness. Of the three basic bar types that may be used, the double bar type provides the maximum in rigidity. It is

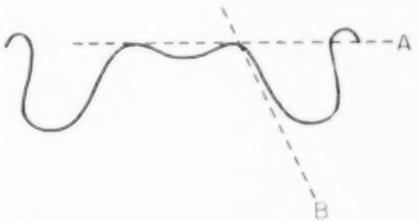

Fig. 3 • Angle formed by the intersection of horizontal plane A of the roof of the mouth and inclined plane B of the palatal surface of the alveolar ridge. At this angle of intersection are resilient pads of adipose and glandular tissue, ideal areas for terminating the borders of palatal flanges of upper saddles

far superior to either a single anterior or posterior bar and should always be used when any doubt is present as to whether a single bar will provide the required degree of rigidity. When placed in the available bar areas on most palates, the two parts of a double bar are on different tissue planes and structurally reinforce one another. A high degree of rigidity is attained with a minimum of bulk.

The third factor to consider in bar type selection is saddle location. In many instances the choice of a bar type is limited by the location of the edentulous ridge areas. If they are situated in the anterior part of the jaw, obviously a posterior bar that provides a maximum of mouth comfort is not possible. And in the opposite situation, where only posterior teeth are missing, the selection of an anterior bar would not be a plausible choice. Many times saddle location is so confined to a specific region of the upper jaw that there is only one choice of bar type possible.

The final factor to be considered in the selection of a connecting bar type is that of indirect retention. This factor need be considered only in the design of free end saddle partial dentures. Some, but not all partial dentures of this type require indirect retention. If ridge areas are long, indirect retention may be necessary. If they lack vertical height or if they are not parallel sided but flare towards the center of the mouth, indirect retention may be necessary. When muscle action and pull are strong and vigorous, indirect retention may be required. All these factors must be studied before deciding whether indirect retention is required. If indirect retention is necessary, a bar type most favorable for this requirement must be selected. To determine which bar type is most favorable, the lever actions and fulcrum lines should be considered. In a bilateral free saddle partial denture, a fulcrum line or axis of rotation exists along a line drawn laterally through the rests on the terminal abutment teeth. The partial denture tends to rotate around this fulcrum line. An occlusalward rotation of the partial denture will cause it to drop. Unfavorable factors of ridge length, size, contour and consistency of mucosa favor this dropping tendency. The bar type used in base design should not further encourage this dropping but rather, by correct design, should both minimize and counteract it. To minimize this dropping tendency it is necessary to bring the center of gravity of the partial denture as close to the fulcrum line as possible. This reduces the lever arm over which the weight of the partial denture acts resulting in a reduced amount of displacing force. To counteract this reduced displacing force it is necessary to have a resisting contact beyond the fulcrum line on the opposite side of the lever system. Although indirect retainers placed on remaining natural teeth may provide these resisting contacts, less critical and exacting requirements will be placed on them if some of these resisting contacts are provided by proper connecting bar design. A bar placed anterior to the fulcrum line provides a resisting contact against dropping tendencies of a free end saddle partial denture thereby furnishing a degree of indirect retention. As the saddles tend to rotate occlusalward, the bar rotates tissueward; and after the mucosa is displaced to the limit of its resiliency, a firm unyielding contact will be established and thereby provide resistance to any further occlusalward rotation of the prosthesis. The only bar type that can act in this fashion is the anterior bar. Its use is indicated whenever indirect retention is required in a partial denture, and the use in such cases of a posterior or double bar should be avoided.

All the afore-mentioned factors must be considered prior to the selection of a bar type, and their relative importance in a given case should be weighted. In varying situations, the weighting of these factors fluctuates and the factor or factors

Fig. 4 • Cast used for illustrating the procedure of upper base design

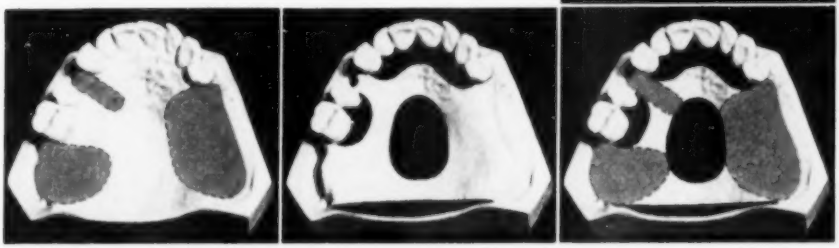

Fig. 5 • Left: Outline of primary bearing areas (saddles). Saddles are carried buccally to the limit of the mucobuccal fold in function. Palatally, they are extended to the angle of intersection of the horizontal plane of the roof of the mouth and the inclined plane of palatal surface of the alveolar ridge. Center: Outline of nonbearing areas. They are (1) lingual gingival tissues within 5 mm. of all seven remaining teeth; (2) torus palatinus; (3) tissues posterior to the vibrating line. Right: Outline of bar areas. A composite is shown of the primary bearing areas (gray) and the nonbearing areas (black). The remaining sections of the palate are bar areas

of greatest weight determine the ultimate selection of a bar type.

In the case under analysis, mouth comfort suggests a posterior bar, rigidity suggests a double bar, indirect retention suggests an anterior bar and saddle location permits any bar type. Since none of these factors have any outstanding weight in relation to the others, any of the three possible bar types may be used and in this case will provide a satisfactory and efficient design.

Step 5—Unification • After the selection of the most advantageous bar type, it is possible to connect the primary bearing areas and get unification of the base. The primary bearing areas or saddles are now connected by the bar type of choice. It is drawn in on the cast under consideration and is carefully confined to the available bar area. Figure 6, left, shows the connections between the saddles that are required to complete an anterior bar design. Figure 6, center, shows the connections necessary to form a posterior bar design and Figure 6, right, shows the method of connecting the saddles with a double bar.

APPLICATION OF DESIGN PROCEDURE TO REPRESENTATIVE CASES

This step-by-step procedure of upper base design can be followed in all types of partial dentures. The outcome will be a final base design that will function efficiently, distribute stresses satisfactorily, cause a minimum of mouth discomfort and avoid irritation of nonbearing areas. To show the practicability of the procedure, its application to a number of representative partially edentulous mouths is presented.

To design the base for the mouth shown in Figure 7, A, the primary bearing and nonbearing areas are outlined (Fig. 7, B). The remaining areas of the upper jaws are available for connecting bar placement. The optimum bar type must be selected after a consideration of the factors which govern the choice. In this specific instance mouth comfort and saddle location indicate the use of a posterior bar. Since the mouth is small and the bar area is wide enough, a posterior bar can be constructed to meet the requirements of sufficient rigidity and therefore would be the final selection. The saddles must now be unified. Figure 7, C, shows the final design after unification of saddles by a posterior bar confined to the available bar area has been completed.

In the cast shown in Figure 8, A, the first two steps are to outline the primary bearing and nonbearing areas (Fig. 8, B). The areas of the jaw not included in these categories constitute the available bar areas. To select a bar type for this specific instance, saddle location is the key consideration. The largest saddle is located anteriorly and indicates the use of an anterior bar. Sufficient bar area is available to design an anterior bar wide enough to provide sufficient rigidity; therefore an anterior bar would be the choice. Figure 8, C, shows the final step of unification where four saddles are joined by the segments of an anterior bar to complete the base design.

Another representative example is shown in Figure 9, A. The first two steps of the procedure are to outline the primary bearing areas and the nonbearing areas (Fig. 9, B). The remaining areas are available for connecting bar placement. The main factors to consider in bar type selection in this case are saddle location and rigidity. The presence of an anterior saddle suggests an anterior bar; however, in this instance it would be unsatisfactory. Because of the great anteroposterior length of this upper jaw, it would not be possible to attain a sufficient degree of rigidity with an anterior bar, even if all the available bar area were utilized. To satisfy this basic requisite of connecting bar design, it is necessary to use a double bar. The final step of base unification is shown in Figure 9, C, where the three saddles are connected with a double bar. Because of its high degree of rigidity, its sections can be made considerably narrower than if a single bar were used.

The applicability of this procedure in all possible instances is shown by the base design analysis of the unusual example depicted in Figure 10, A. Primary bearing and nonbearing areas are outlined (Fig. 10, B) and the remaining areas are available bar areas. For bar type selection, the factor of saddle location is given prime consideration. The anterior location of the two saddles indicates an anterior bar type. In this case, however, the design would be incomplete with an anterior bar. In this instance, where an asymmetrical arrangement of edentulous areas is present, stabilizing clasps must be incorporated in the design of the clasp component of the partial denture. As the design of the clasp and rest components usually precedes base design in a partial denture, the position of any stabilizing clasps or indirect retainers (rests) that are to be used is known. Connecting bars, confined to the available bar areas must be provided to join any stabilizing clasps or indirect retainers to the main base. In the example under consideration, stabilizing clasps would provide greatest stabilizing leverages if placed on the second molars. Connecting bars from the saddles must be designed to join these stabilizing clasps to the base. If this is done in conjunction with an anterior bar, the resulting base would not have sufficient rigidity. The sections carrying the stabilizing clasps could easily flex, resulting in a failure to provide the required stabilizing leverages. To provide the necessary rigidity, a double bar would

Fig. 6 • Left: Unification using an anterior bar. In the available bar areas, connections are made between saddles to form an anterior bar. Center: Unification using a posterior bar. In the available bar areas, connections are made between saddles to form a posterior bar. Right: Unification using a double bar. In the available bar areas, connections are made between saddles to form a double bar

be the bar type of choice. Figure 10, C, shows the step of unification whereby the primary bearing areas (saddles) are joined and supports for stabilizing clasps are provided by means of a double bar.

VARIATIONS IN UPPER BASE DESIGN

In many instances, a previously successful upper base design may be empirically used in a second instance where a similar or identical tooth arrangement is present. Although this procedure often will give a correct design, occasionally an inefficient or incorrect design may result. To illustrate the hazards of designing upper bases empirically rather than following a basic method incorporating fundamentals, instances where similar and identical tooth arrangements exist will be analyzed.

In Figure 11, A and B, primary bearing and nonbearing areas are routinely outlined. In selecting a bar type to be placed in the available bar areas, the chief factor to be considered is indirect retention since this is a free end saddle prosthesis which is prone to drop unless provided with indirect retention. Although indirect retention may be provided by resisting contacts on teeth anterior to the fulcrum line, the base should have as much inherent stability as is possible. As the ridges in this mouth

Fig. 7 • A: Cast. B: Composite showing outline of primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Saddle location and mouth comfort indicate the use of a posterior bar, and sufficient rigidity is possible with a posterior bar. The connection necessary to form a posterior bar design is shown outlined

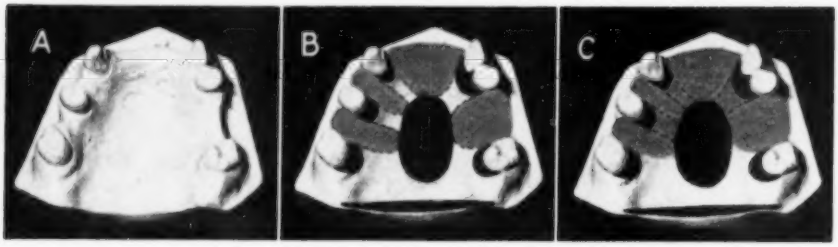

Fig. 8 • A: Cast. B: Composite showing outline of the primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Saddle location indicates use of an anterior bar and satisfactory rigidity is possible with an anterior bar. Connections necessary to form an anterior bar design are shown outlined

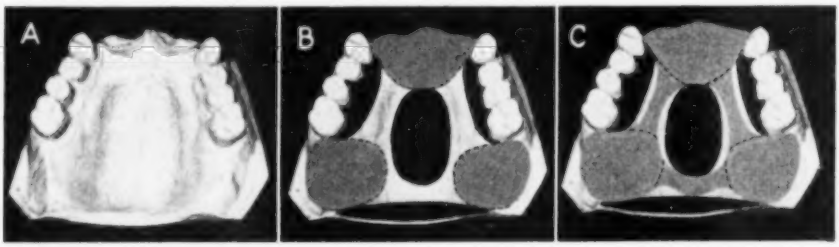

Fig. 9 • A: Cast. B: Composite showing outline of the primary bearing areas (gray) and the nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Because of length of jaw, satisfactory rigidity can be attained only by use of double bar. Connections necessary to form a double bar design are shown outlined

are not of a satisfactory vertical height, and as the buccal walls flare towards the center of the mouth, the dropping tendency will be accentuated. To provide this base with inherent stability and minimize the dropping tendency, an anterior bar should be used. It moves the center of gravity of the base closer to the axis of rotation or fulcrum line than any of the other bar types. It also provides a resisting tissue contact anterior to the fulcrum line. The step of unification joins the anterior bar to the saddles to complete the design (Fig. 11, C).

In Figure 12, A, a tooth arrangement similar to that shown in Figure 11 is shown. Design analysis, however, leads to a different result. After the outline of the primary bearing, nonbearing and bar areas (Fig. 12, B), a study of factors governing the selection of a bar type is made. This is a free end saddle prosthesis; therefore, the factor of indirect retention must be carefully considered. In this instance, the ridges are full, well-rounded, have good vertical height, and their buccal walls are slightly undercut. Because of these favorable factors, there will be little or no dropping tendency and little need for indirect retention. An anterior bar that provides the maximum in indirect retention, which was exemplified in Figure 11, would not provide sufficient rigidity because of the relatively narrow width of the available bar area. To provide the necessary rigidity in this large base, a double bar design is indicated. The final step of unification connects the

saddles together with a double bar confined to the available bar area. (Fig. 12, C).

A comparison of the final base designs for these two casts is shown in Figures 13 and 14. This variation in design would never have been arrived at by employing an empirical procedure of design. A consideration of the factors controlling base design, however, brings out the differences between these apparently similar mouths and indicates the designs necessary for an optimum result.

The casts shown in Figure 15, A, and Figure 16, A, are of mouths with identical tooth arrangements. To arrive at a design for the one shown in Figure 15, A, the steps of outlining the primary bearing, nonbearing and bar areas are performed (Fig. 15, B). In selecting a bar type, the narrow width of the available bar area precludes the attainment of a satisfactory degree of rigidity with a single bar type. A double bar is the only possible selection that will satisfy the requirement of rigidity. Unifying the saddles with this type of connecting bar completes the base design (Fig. 15, C).

In Figure 16, A, although an identical arrangement is present, following the steps in base design gives an entirely different result. After the primary bearing

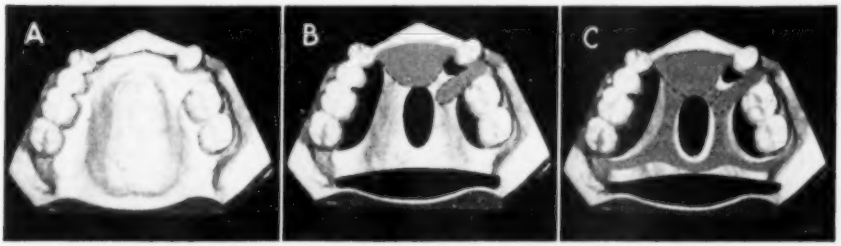

Fig. 10 • A: Cast. B: Composite showing outline of the primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Because of asymmetrical arrangement of edentulous areas, clasps are needed on the second molars to provide stabilizing leverages. Connecting bars must be provided to join these stabilizing clasps to the main base. To impart the necessary rigidity to these connecting bars, a double bar design is required. Connections necessary to form double bar design are shown outlined

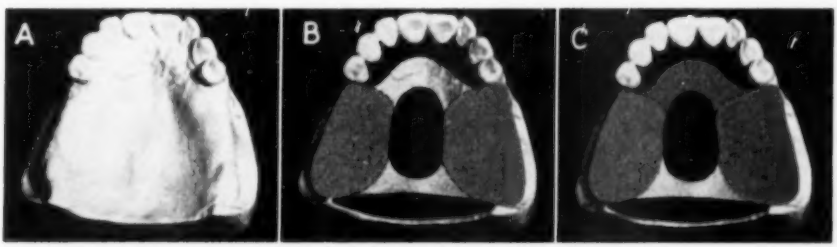

Fig. 11 • A: Cast. B: Composite showing outline of primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Unfavorable ridge contours of primary bearing areas indicate need of indirect retention. An anterior bar minimizes dropping tendency of an upper free end saddle base and provides some indirect retention. It is indicated for this case. The connection necessary to form an anterior bar is shown outlined in the available bar area

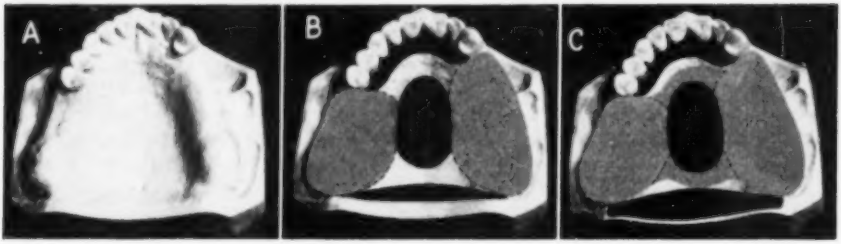

Fig. 12 • A: Cast. B: Composite showing outline of primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Favorable ridge contour of primary bearing areas minimizes need for indirect retention. Large jaw size and narrow width of bar area preclude attainment of rigidity with anterior bar. A double bar is required to provide the necessary rigidity. Connections necessary to form a double bar are shown outlined

areas are outlined, a study of the nonbearing areas to be outlined reveals the key difference in mouth structures that exists (Fig. 16, B). The mouth under consideration has a high vault with the complete absence of a torus palatinus, whereas in contrast, the one shown in Figure 15 has a prominent torus palatinus. The variation in this structure is responsible for the difference in the outline of the available bar areas. In the absence of a torus palatinus, a considerably greater bar area is available. A short direct connection of all saddles is possible with a single bar across the center of the mouth, which makes this usually nonbearing area avail-

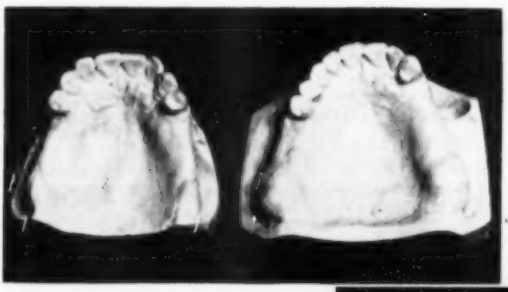

Fig. 13 • Comparison of two instances of similar tooth arrangements. Left: Jaw size is small and ridge contour unfavorable. Need for indirect retention is important factor. Right: Jaw size is large and ridge contour favorable. The need for indirect retention is negligible. Attainment of sufficient rigidity is key factor governing selection of bar type

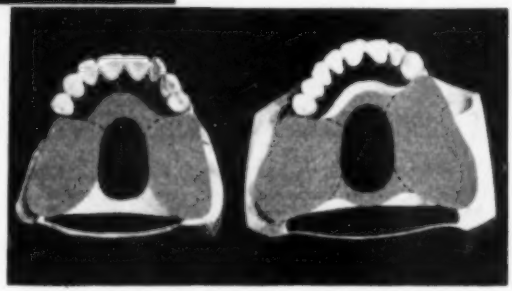

Fig. 14 • Comparison of final base designs in two instances with similar tooth arrangements. Left: Need for indirect retention indicates use of an anterior bar design. Right: Negligible requirement of indirect retention and necessity of sufficient rigidity indicate the use of a double bar design

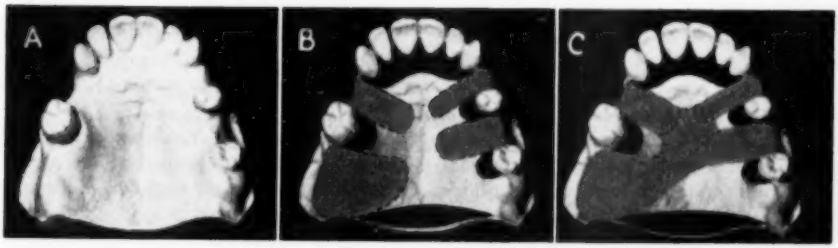

Fig. 15 • A: Cast. B: Composite showing outline of the primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are the bar areas. C: Selection of bar type and unification. Because of narrow width of available bar areas, sufficient rigidity can be attained only with double bar. Connections necessary to form a double bar design are shown outlined

able. The step of unification unites the saddles with this connection to complete the design (Fig. 16, C).

A comparison of these two examples of identical tooth arrangements is shown in Figure 17 and Figure 18. The considerable difference in their base design emphasizes the necessity of following a procedure of careful study and analysis rather than one of empiricism.

This procedure of upper base design can be applied only when gold or cobalt chromium alloy is used for connecting bar construction. In instances where a base entirely of acrylic resin is used, variations in design are limited. Full palate or horseshoe coverage are the two chief possibilities. Designs of this type, although serviceable, fall far short of the ideal in base design because they are weak, bulky, deprive patients of maximum mouth comfort and encroach on nonbearing areas.

SUMMARY

To support a partial denture properly, residual alveolar ridges as well as natural teeth must be utilized. Ridges are utilized for this purpose by the base of the partial denture. The base consists of saddles and connecting bars.

To fulfill the functions of saddles satisfactorily, they should have maximum

Fig. 16 • A: Cast. B: Composite showing outline of primary bearing areas (gray) and nonbearing areas (black). The remaining sections of the palate are bar areas. C: Selection of bar type and unification. There is an absence of a torus palatinus; therefore, a greater than usual bar area is available. A direct connection of all saddles is possible with single bar across the center of the jaw

coverage of all available bearing areas. The functions of connecting bars are saddle connection and stress transmission.

The requirements to effectively perform these functions are (1) maximum rigidity, (2) avoidance of contact with resistant nonbearing areas and (3) minimum bulk commensurate with function.

The upper jaw presents greater problems in base design than the lower jaw. Limitation of the palatal flange of the saddle must be considered in saddle outline, and the presence of resistant nonbearing areas must be considered in connecting bar outline.

The design of any upper partial denture base can be arrived at by following a procedure consisting of five steps.

Step 1—Outline of Primary Bearing Areas (Saddles) • Buccally saddles are extended to the limit of the mucobuccal fold in function. Palatally, saddles are extended to angle of intersection of the horizontal plane of the roof of the mouth and the inclined plane of the alveolar process. At this angle lie resilient pads of adipose and glandular tissue which are ideal areas for border termination.

Step 2—Outline of Nonbearing Areas • Nonbearing areas that must be avoided in upper base design are outlined. They are (1) lingual gingival tissues 5 mm. adjacent to necks of remaining natural teeth, (2) torus palatinus or "hard area" and (3) palatal tissue posterior to the vibrating line of soft palate.

Step 3—Outline of Bar Areas • Bar areas are any mouth areas not included in the outline of the primary bearing or the nonbearing areas. This entire area is available for coverage by connecting bars.

Step 4—Selection of Bar Type • Selection of bar type is governed by an analysis of four controlling factors. They are (1) mouth comfort, (2) rigidity, (3) saddle location and (4) indirect retention. They

Fig. 17 • Comparison of two casts with identical tooth arrangements. Considerable difference exists in size of torus palatinus. Left: Prominent torus palatinus reduces width of available bar areas and governs selection of bar type. Right: Absence of torus palatinus increases width of available bar areas and simplifies connecting bar design

Fig. 18 • Comparison of final base designs in two instances with identical tooth arrangements. Left: Narrow width of available bar areas indicates use of double bar. Right: Great width of available bar area, because of absence of torus palatinus, indicates use of single bar across center of jaw

must be considered prior to the selection of a bar type and their relative importance weighed. The factor or factors of greatest weight determines the final selection of a bar type.

Step 5—Unification • Unification consists of joining the primary bearing areas (saddles) with the selected bar type, confining the connection to the available bar areas.

This procedure can be applied to all types of partially edentulous mouths and in many instances will indicate variations in base design in mouths where similar or identical tooth arrangements are present.

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The common diseases of practicing dentists

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In dental circles there has been frequent discussion on the topic of morbidity among dentists, and the question has often arisen as to whether the practice of dentistry predisposes to certain constitutional disabilities or to illnesses which might be termed "occupational."

PREVIOUS STUDIES

Whereas there have been a number of studies along these lines in regard to the medical profession, there seems to be only one published report dealing with dentists, that is, the report based on observations by the Mayo Clinic of 273 dentists who were examined there during the calendar year of 1940.[1]

In July 1946 a report was published of a poll taken among dentists as to what they considered their occupational diseases.[2] The concept with which this study was approached is evident from the title of the report "The Occupational Hazards in Dental Practice." The answers from 2,400 dentists offer interesting points of reference for the present study. Almost 100 per cent believed that the practice of dentistry made dentists susceptible to certain diseases. In Table 1, in which the conditions are arranged in the order of the percentage of dentists who considered them as possible occupational diseases, it is to be noted that eyestrain and rheumatic conditions are high on the list, whereas nervous conditions and heart disease are comparatively low.

STUDY GROUP

The Newark Clinical Group had the opportunity to observe 56 dentists over a period of years. These dentists appeared for medical attention in the same manner as other patients and were subjected to the same routine procedure. Full his-

Presented at the annual clinics, dental department, Newark Beth Israel Hospital, March 12, 1952.

*Formerly medical records librarian, Newark Clinical Group.

1. Austin, L. T., and Kruger, G. O. Common ailments of dentists: a statistical study. J.A.D.A. 35:797 Dec. 1, 1947.

2. Biller, Florence E. Occupational hazards in dental practice. Oral Hyg. 36:1194 July 1946.

Table 1 • Percentage of 2,400 dentists believing condition to be related to dental practice*

Condition	Per cent
Eyestrain	87.6
Postural defects	77.9
Neurocirculatory disease (including varicose veins)	66.7
Low-back pain	65.7
Flat feet	60.1
Nervous disease	56.0
Upper respiratory infections	46.5
Heart disease	41.0
Ulcers	37.8
Chronic constipation	38.4
Skin allergies	38.9
Arthritis	21.6
Lung diseases	22.2

*Taken from Biller, "Occupational Hazards in Dental Practice."[2]

tories were obtained; the dentists were given complete physical examinations including fluoroscopic examinations and blood and urine analyses. For patients over 35, the routine examination included electrocardiography and proctoscopy. Consultations of specialists, roentgen-ray studies and further laboratory work were arranged as indicated in each individual case. Since all the patients were from communities for which the Newark Clinical Group is readily accessible, it was possible to observe these patients on therapeutic regimens and to confirm or re-evaluate diagnoses based on the original examinations. The diagnoses as finally established were indexed in accordance with the terminology of the *Standard Nomenclature of Diseases and Operations*[3] and are listed in this report in accordance with this terminology. Because of the circumstances under which these data were obtained, they form an unusually valid basis for tabulating morbidity incidence among dentists and for comparing this incidence with that of the general population and also that of other professions.

OBSERVATIONS ON INCIDENCE OF CONDITIONS

The observations by the Newark Clinical Group are set forth in Tables 2, 3 and 4. These tables indicate the incidence of all significant conditions observed in the group of 56 patients. Percentage data are divided according to age into two groups: one of patients less than 45 years of age and the other of patients 45 years and older. There is a significant difference between these two groups both in subjective complaints and in physical conditions. Of the 56 dentists, 36 were under 45 years of age; 20 were 45 years or over. A table has been included to show the incidence of the most common diseases. Any disease occurring five or more times was arbitrarily classified as a common condition. Analyzed according to a general diagnostic classification, the incidence of conditions was as follows:

Anxiety State • An anxiety state was the most frequently occurring condition. It was observed in the entire group of 56 in 24 instances (42.1 per cent), in the age group under 45 in 19 instances (52.7 per cent), and in the group 45 or over in 5 instances (25 per cent).

Gastrointestinal Disorders • Gastrointestinal disorders constituted the second largest group of conditions observed. Of the 56 dentists, there were 20 with disorders of this type (35.7 per cent), 12 in the younger group (33 per cent) and 8 in the older group (40 per cent).

Cardiovascular Disabilities • Cardiovascular disabilities constituted the third largest group of conditions observed. There were 17 cases (30.5 per cent), 9 in the younger group (25 per cent) and 8 in the older group (40 per cent).

Respiratory Ailments • Respiratory ailments constituted the fourth largest group. There were 14 cases of respira-

3. Jordan, Edwin P., editor. Standard nomenclature of disease and standard nomenclature of operations, ed. 3. Chicago, American Medical Association, 1942.

Table 2 • Incidence of disease according to general diagnostic classification

Diagnostic classification	Total group		Age less than 45		Age 45 or over	
	Cases	Per cent of 56 cases	Cases	Per cent of 36 cases	Cases	Per cent of 20 cases
Anxiety state	24	42.1	19	52.7	5	25
Rheumatic disease	14	25.0	5	13.8	9	45
Respiratory disease	14	25.0	10	28.0	4	20
Cardiovascular disease	17	30.5	9	25.0	8	40
Gastrointestinal disease	20	35.7	12	33.0	8	40
Miscellaneous disease	29	51.7	12	33.0	17	85
Malignant conditions	2	3.6	0		2	10
Occupational diseases	1	1.7	0		1	5

tory conditions (25 per cent), 10 in the younger group (28 per cent) and 4 in the older group (20 per cent).

Rheumatic Conditions • Of the cases of rheumatic conditions, the total was 14 (25 per cent), 5 in the younger group (13.8 per cent) and 9 in the older group (45 per cent).

Malignant Conditions • Malignant conditions were observed in two cases.

Conditions of Occupational Etiology • This diagnosis was made in only one case, that of a patient with postural low-backache.

COMMENT

The fact that these observations are not in complete accord with the statistics reported by the Mayo Clinic is obvious from the following comparison:

Category	*Mayo Clinic*	*Newark Clinical Group*
Anxiety state (reported as exhaustion state by the Mayo Clinic)	18.7%	42.1%
Gastrointestinal conditions	25.6%	35.7%
Rheumatic conditions ...	11.4%	25.0%
Cardiovascular conditions	16.5%	30.5%
Occupational conditions.	5.9%	1.7%

It is probable that the differences in these observations are in large part due to the fact that the patients at the Newark Clinical Group came from a comparatively small, highly industrialized metropolitan area, whereas the patients seen at the Mayo Clinic for the most part were from a large midwestern area, predominantly rural, with a sprinkling of other patients from all over the world. Therefore, the Mayo Clinic patients represented an entirely different economic and social background from that of the Newark group. Moreover, a large number of the patients at the Newark Clinical

Table 3 • Frequency of most common diagnoses

Specific diagnosis	Total group		Age less than 45		Age 45 or over	
	Cases	Per cent of 56 cases	Cases	Per cent of 36 cases	Cases	Per cent of 20 cases
Anxiety state	24	42.1	19	52.7	5	25
Cardiovascular disease: hypertensive and arteriosclerotic	13	23.3	8	22.3	5	25
Osteoarthritis, spine	10	17.8	5	13.8	5	25
Hemorrhoids	7	12.5	4	11.1	3	15
Diabetes mellitus	6	10.7	1	2.8	5	25
Inguinal hernia	6	10.7	2	5.5	4	20
Gallbladder disease	5	8.9	4	11.1	1	5
Allergic rhinitis	5	8.9	3	8.3	2	10

Table 4 • Incidence of specific conditions

Diagnosis	Total group		Age less than 45		Age 45 or over	
	Cases	Per cent of 56 cases	Cases	Per cent of 36 cases	Cases	Per cent of 20 cases
Anxiety state	24	42.1	19	52.7	5	25
Diseases of joints and bones						
Osteoarthritis, spine	10	17.8	5	13.8	5	25
Rheumatoid arthritis	1	1.7	0		1	5
Spinal curvature	1	1.7	0		1	5
Spondylolisthesis, congenital defect	1	1.7	0		1	5
Diseases of respiratory system						
Allergic rhinitis	5	8.9	3	8.3	2	10
Vasomotor rhinitis, mechanical	3	5.4	3	8.3	0	
Allergic sinusitis	2	3.6	1	2.8	1	5
Nasal septum, deviated	2	3.6	2	5.5	0	
Bronchial asthma	1	1.7	1	2.8	0	
Allergic bronchitis	1	1.7	0		1	5
Cardiovascular diseases						
Arteriosclerotic cardiovascular disease	7	12.5	4	11.1	3	15
Hypertensive and arteriosclerotic cardiovascular disease	4	7.1	2	5.5	2	10
Essential hypertension	2	3.6	2	5.5	0	
Myocardial infarction	3	5.4	1	2.8	2	10
Angina pectoris	1	1.7	0		1	5
Gastrointestinal diseases						
Gallbladder disease	5	8.9	4	11.1	1	5
Infectious hepatitis	3	5.3	3	8.3	0	
Duodenal ulcer	2	3.6	0		2	10
Diverticulum, colon	2	3.6	0		2	10
Carcinoma, rectosigmoid	1	1.7	0		1	5
Carcinoma, colon	1	1.7	0		1	5
Colitis, psychogenic	1	1.7	1	2.8	0	
Colitis, ulcerative	1	1.7	1	2.8	0	
Colitis, mucous	1	1.7	1	2.8	0	
Esophageal hiatus hernia	1	1.7	0		1	5
Ileitis, regional	1	1.7	1	2.8	0	
Appendicitis	1	1.7	1	2.8	0	
Miscellaneous diseases						
Hemorrhoids	7	12.5	4	11.1	3	15
Diabetes mellitus	6	10.7	1	2.8	5	25
Inguinal hernia	6	10.7	2	5.5	4	20
Varicose veins	2	3.6	1	2.8	1	5
Tonsillitis	2	3.6	2	5.5	0	
Gout	1	1.7	0		1	5
Hypothyroidism	1	1.7	0		1	5
Fracture, metatarsal, spontaneous	1	1.7	1	2.8	0	
Contusion, pectoral muscle	1	1.7	0		1	5
Psoriasis	2	3.6	1	2.8	1	5
Postural low backache	1	1.7	0		1	5

Group were in the acute stages of their illnesses, whereas the Mayo group in all probability had a limited number of acute cases. This would be particularly true of cases of myocardial infarction, angina pectoris and acute surgical emergency. Conversely, it is probable that the larger ratio of occupational conditions observed by the Mayo Clinic is due to the fact that patients with metal, drug and radiation dermatitis went to the Mayo Clinic for that particular treatment, whereas in the area served by the Newark Clinical Group a patient with such a condition would be more likely to seek treatment from one of the many specialized insti-

tutions or practitioners available.

As to whether the practice of dentistry predisposes to the development of certain diseases, some enlightenment may be gained from a comparison of the observations by the Clinic of the 56 dentists with the statistics for the other patients examined at the Newark Clinical Group. In most of the categories listed, there were no significant differences. With regard to anxiety state and cardiovascular conditions, however, there were significant differences. The percentage of patients suffering from the anxiety state was 42.1 per cent among the dentists as against 12.3 per cent for other patients. The percentage of dentists with cardiovascular diseases was 30.5 per cent as against 18.3 per cent for the other patients.

Though it is true that 56 cases represent a comparatively small group with a limited statistical value, certain significant trends are observable. Anxiety or exhaustion states appear to be a definite occupational hazard among dentists. Both the statistics of the Newark Clinical Group and those of the Mayo Clinic show a significantly higher incidence of such states among dentists than in the general population. This is particularly true of the younger group. One is led to surmise that the strain of developing a practice after trying to find a suitable location, plus the effort to maintain a time schedule in the office and a payment schedule in the bank, in addition to the usual frustrations of dental practice produces the stress phenomena which lead to the development of an anxiety or exhaustion state. The strain may be especially severe for dentists because of the high cost of setting up an office, the wide variety of problems facing each dentist and the competition encountered in most metropolitan areas.

The high incidence of cardiovascular disease in the Newark group of dentists is probably related to the high incidence of anxiety states and also to the long hours of diligent, tense office work, at times involving hard physical effort under trying circumstances. The combination of all these factors may result in increased work for the heart and in coronary narrowing. A situation of this type definitely predisposes to so-called coronary failure and may lead to angina pectoris or even to myocardial infarction. For an already damaged heart, these factors certainly tend to hasten cardiac breakdown.

It should be noted at this point that dentists as a class are more fortunate in respect to cardiovascular disabilities than are their brother practitioners in medicine or executives of comparable economic and social status. An examination conducted in 1949 of 149 executives of the Consolidated Edison Company of New York City[4] showed that 36 per cent were subject to cardiovascular disabilities. A similar study of 200 practicing physicians in New York City[5] showed that 46 per cent had cardiovascular disabilities. As against these figures, the incidence of 16.5 per cent in the Mayo group of dentists and 30.5 per cent in the Newark group appears moderate.

SUMMARY

In this study the incidence of disease in a group of 56 dentists who had been observed for a period of years at the Newark Clinical Group was studied and compared with the incidence reported in a previous study and likewise with a self-appraisal made by dentists of their own occupational diseases. The main conclusion reached was that the anxiety state is the chief occupational disease of dentists.

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4. Franco, Charles S. Periodic health examination of executives. Indust. Med. 19:213 May 1950.

5. Master, A. M.; Chesky, K., and Pordy, L. The cardiovascular examination of 200 practicing physicians over the age of forty. New York State J. Med. 51:1713 July 15, 1951.

Concepts of occlusion in physical anthropology and comparative anatomy

Albert A. Dahlberg, D.D.S., Chicago

Physical anthropology and comparative anatomy give explanations to many of the problems of occlusion in modern man. Certain of the concepts in these sciences reflect the development of occlusion, and others bring into comparison different types of chewing mechanisms in the animal kingdom. Study of these subjects leads to a better understanding of occlusion.

This presentation will be confined to the morphological and evolutionary phases of the subject. The purpose of this paper is to bring into focus from these sciences certain pertinent basic concepts that are background material for discussions of occlusion. These concepts stem as well from the sister sciences of ecology, zoology, paleontology and genetics, and exemplify the operation of two natural processes; namely, variation and evolution.

HUMAN DENTITION: NATURAL TOOTH GROUPS

Occlusion may be said generally to depend on contact of teeth of one jaw with those of the other. This contact and relationship is a variable thing in modern man, but certain aspects of these relationships are fairly constant and historically follow a given pattern or modification of the pattern. Molars occlude with molars, incisors with incisors, and so on. More specifically, certain cusp, groove, and fossa relationships exist, and further, roots and their relationships to other roots and to bone also are involved. Milo Hellman[1] published a list of 138 factors of occlusion which were actually a series of cusp-fossa-groove-ridge-embrasure-surface contacts between teeth of opposing jaws. His estimate that on the average only 91 per cent of the possible 138 contacts exist in dentitions having normal occlusion is one way of evaluating the relationship of upper to lower teeth in modern dentitions. These contacts are important, even though the process of attrition in function obliterates many of them in the presence of certain abrasive-containing or excessive wear-producing diets.

For the background of the problems of occlusion and of the human dentition generally, the terms and natural units observed in the operations of genetics, evolution and function are most significant.[2,3] Therefore, instead of individual teeth, the incisor group of teeth, the canine group (only one tooth, but operat-

Presented at the conference on "Concepts Pertaining to Occlusion" sponsored by the Bureau of Library and Indexing Service, Central Office, American Dental Association, June 20, 1952.

Research associate, department of anthropology, University of Chicago.

1. Hellman, Milo. Factors influencing occlusion. Angle Orthodont. 12:3 Jan. 1942.

2. Dahlberg, A. A. Changing dentition of man. J.A.D.A. 32:676 June 1945.

3. Dahlberg, A. A. Dentition of the American Indian. In Physical anthropology of the American Indian. New York, Viking Fund, Inc., 1949, p. 138-176.

ing independently as a group), the premolar or bicuspid group and the molar group (Fig. 1) are the important units in which to study occlusal relationships in modern man.

Each tooth group is distinguished by certain characters which give the group its individuality and distinguish it from the others. These characters are more prominent in some individuals or in some entire populations than in others. To cite a few of these characters, the pattern of four cusps of upper molars may be mentioned; the "Y" pattern of grooves formed between the cusps on lower molars and the extra cusp known as Carabelli's cusp on the mesiolingual cusp of upper molars. These are primary characters and constitute part of the fundamental architecture of the tooth group in which they are to be found.

There is also another class of characters which may be called secondary or negative characters. These generally are modifications or absence of primary characters. They are negative in expression, but positive manifestations of the genetic constitution of the individual. Examples readily recognized are the peg-shaped or absent lateral incisor and reduction or absence of certain cusps.

These primary and secondary characters follow a definite pattern and orderliness in their location, expression and appearance in the tooth groups. It is the variation of these characters which influences occlusion in the manner referred to by Milo Hellman in his list of 138 factors of occlusion.

VARIATION OF CHARACTERS IN THE TOOTH GROUPS

The experience of clinicians and the statistics available on tooth characters reveal that each tooth group has one particular tooth which is never absent congenitally except in combination with other teeth in its group, is practically never of an anomalous character, is extremely resistant to variation from its normal pattern and almost always retains ancestral patterns and characteristics even when these are lost by evolutionary or other changes in other members of the given tooth group (Fig. 1). This tooth is known as the stable tooth as contrasted to the other more variable teeth in the group. Thus, the upper central incisor, the lower lateral incisor, the canines, the first premolars and the first molars are the stable teeth. Variation is least in these teeth and greatest in the others. The greater the variation, of course, the fewer the contacts noted by Hellman.

Upper Teeth	S	V	S	S	V		S	V	V
	I_1	I_2	C	Pm_1		Pm_2	M_1	M_2	M_3
Lower Teeth	I_1	I_2	C	Pm_1		Pm_2	M_1	M_2	M_3
	V	S	S	S	V		S	V	V

Fig. 1 • The four tooth groups: the incisors (I); the canines (C); the premolars (P), and the molars (M). S: stable teeth; V: variable teeth

Probably the most important thing to take cognizance of in the foregoing is the fact that there are four morphological key points of stability in each quadrant of the dentition, and variation in size and form is greater in all the other teeth. It is obvious that this circumstance influences occlusion.

EVOLUTION OF TOOTH CROWN FORM

A quick review of the evolution of the individual teeth will give another aspect of the variation problem and also will give the history of the relationship of cusps, grooves, fossae and so forth.[4] A few points in the sequence are not en-

4. Gregory, W. K. Origin and evolution of the human dentition. Baltimore, Williams & Wilkins Co., 1922.

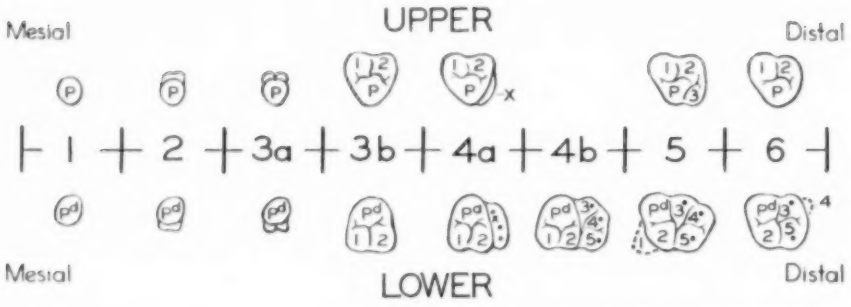


Fig. 2 • Sequence of the evolution of upper and lower molars from the simple reptilelike single cone (Stage 1) to the regressing form (Stage 6). In each row of diagrams, the buccal side is at the top; the lingual, at the bottom

tirely settled, but the following description of the evolution of tooth crown form is probable and avoids confusing the issue on minor points.

Figure 2 shows diagrammatically an upper and lower molar tooth in stages of occlusal surface development. Stage 1 represents the single, simple coned reptilelike tooth designated with the letter "P." Stage 2 shows a development of a heavy cingulum from which developed two cusps (Stage 3a), buccally in the upper and lingually on the lower. Stage 3b shows the well developed three main cusps in a triangular arrangement. A heel (x) developed from the cingulum on the distal aspect of both upper and lower molars (Stage 4a). From this heel in the upper molar there emerged and developed the distolingual cusp of the modern four-cusped tooth (Stage 5). In the lower tooth three cusps appeared on the heel (3, 4, 5 of Stage 4b). These were rearranged and cusp 1 was lost, leaving the familiar five-cusped tooth which is still present in the lower first molar of modern man (Stage 5). In most early men, the three lower molars had the five cusps with a "Y" formation of the intervening grooves. The distobuccal cusp (3b) is missing in most second and third lower molars of the white race of today and some other populations.

The last parts added to the molars are most variable in form and size and sometimes are missing entirely. These parts are the distolingual cusp of upper molars and the distobuccal and distolingual cusps of lower molars.

EVOLUTION OF OCCLUSION IN THE MOLAR SERIES

The three-coned teeth of Stage 3b had a shearing action when lower teeth closed to the upper (Fig. 3). The development of the heels on the respective molars limited this shearing (Fig. 4) and gradually the enlargement of these parts with the development of sulci and cusps provided a receptive surface for the "P" cusp of the opposing teeth (Fig. 5). In other words, a grinding or occluding surface was evolved. This is the relationship with slight modifications that exists today and is the basis for definitions of "normal" occlusion (Fig. 6).

EVOLUTION OF ERUPTION SEQUENCES

Eruption sequences of the various teeth are an important aspect in the background of occlusion. It is well known that the timing and sequence of eruption of the teeth in an individual have far-reaching results on the tooth relationships that are finally effected.

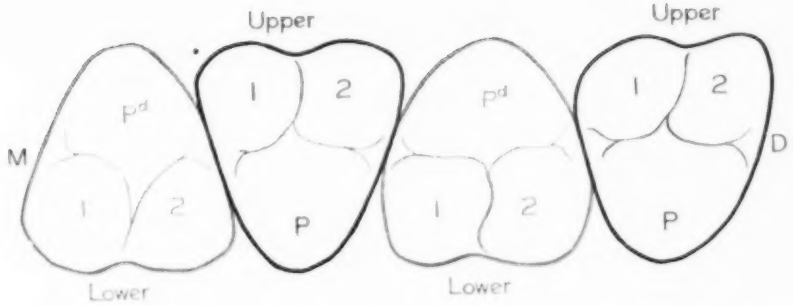


Fig. 3 • Occlusal relationship of upper and lower molar teeth of Stage 3b, Figure 2. The buccal side is at the top; the lingual, at the bottom

In certain animal forms it is necessary to have an efficient masticating mechanism available or matured early in life for reasons of survival. Some forms have even evolved under selective pressures in evolution to the point where no use is made of a deciduous dentition at all. Many marsupials, for example, have only one tooth which is replaced by a successional tooth: the tarsier replaces only three; the seal develops, erupts and sheds its entire deciduous dentition *in utero*.

Growth factors differ and in some forms the second and third molars are brought into functional positions much earlier. Figure 7 reproduces Adolph Schultz's[5,6] diagrammatic description of eruption sequences of permanent teeth in the primates, with his suggestion of the hypothetical ancestral sequence for comparison. Modern man's eruption sequence deviates most from the hypothetical ancestral sequence. It is in these particular deviants that many investigators have found most significance in occlusal relationship results. They state that the shorter the time from beginning to end of replacement and the earlier the second molar and the later the canine eruption, the more nearly "normal" is the occlu-

5. Schultz, A. H. Eruption and decay of the permanent teeth in primates. Am. J. Phys. Anthropol. 19:496 Jan.-March 1935.

6. Schultz, A. H. Age changes and variability in gibbons. A morphological study of a population sample of a man-like ape. Am. J. Phys. Anthropol. N.S. 2:41 March 1944.

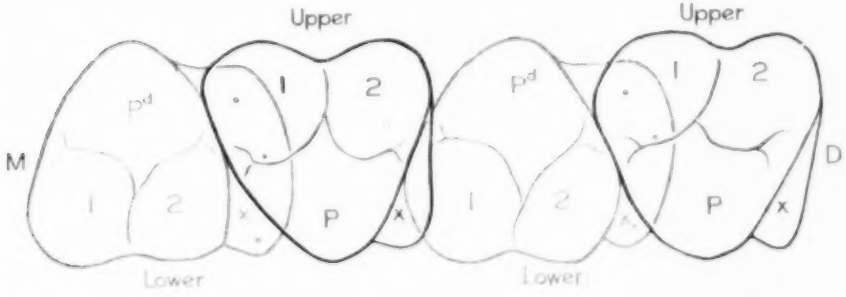


Fig. 4 • Occlusal relationship of upper and lower molar teeth of Stage 4a, Figure 2. The buccal side is at the top; the lingual, at the bottom

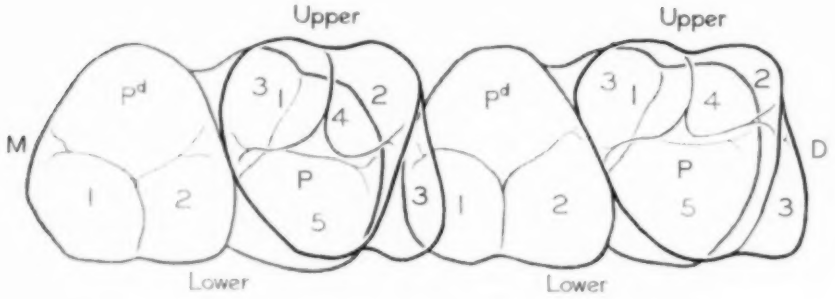


Fig. 5 • Further stage of occlusal relationship of upper and lower molar teeth of Stage 4b (lower) and 5 (upper), Figure 2. The buccal side is at the top; the lingual, at the bottom

sion; that is, the closer the approximation of the timing and sequence to that of the hypothetical primitive order, the better the occlusion. These are factors which depend to a considerable extent on genetics.

ANCESTRAL AND MODERN DENTITION

All dentitions of modern men are derived from the dentitions of their predecessors who ultimately reach back to early man. A hypothetical ancestral dentition has been set up, based on what is known from the many specimens of these fossil men. Its morphological characters could be listed one by one, tooth by tooth, from central incisor to third molar, with the matching characters of modern dentitions listed below them; but space makes it impracticable to include such a comparison here. One character will be used to illustrate a theory of derivation of modern tooth characters. Most present day characters are modified, being simplified, intensified or specialized, from those seen in the ancestral forms. The shovel-shaped character of upper incisors was moderate in expression in the ancestral forms. Modern man expresses this character in various ways. Some populations have lost the character (most modern

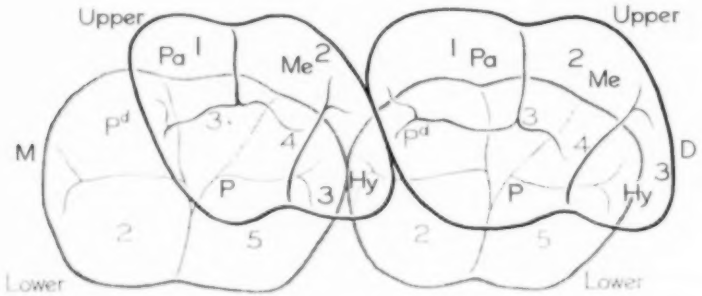


Fig. 6 • Occlusal relationship of upper and lower molar teeth of Stage 5, Figure 2. Pa: paracone; Me: metacone; P: protocone; Pd: protoconid; Hy: hypocone. The buccal side is at the top; the lingual, at the bottom

HYPOTHETICAL ORIGINAL FORMULA	M_1	M_2	M_3		I_1	I_2		P_1	P_2	C
LANGUR	M_1		M_2	I_1	I_2		M_3	[P_1	P_2]	C
ORANG-UTAN	M_1			I_1	[I_2	M_2]		[P_1	P_2]	C	M_3
CHIMPANZEE	M_1			I_1	I_2	M_2		[P_1	P_2]	C	M_3
GIBBON	M_1	I_1			I_2	M_2		[P_1	P_2]	C	M_3
FOSSIL MAN	M_1	I_1	I_2			M_2		[P_1	P_2]	C	M_3
RECENT WHITE	[M_1	I_1]			I_2		[P_1	C	P_2]	M_2	M_3

SEQUENCE OF ERUPTION OF PERMANENT TEETH

Fig. 7 • Sequence of eruption of permanent teeth in different primates. The teeth shown in parentheses appear in rapid and often irregular succession; spacing of the letters indicates the relative time of eruption (Schultz, 1944)

whites). Some have retained it as it was (certain Asiatics). Others have even accentuated it (Amerinds).[3] Specializations of character occur also which are not quantitative, but new qualitative entities. This loss, accentuation or specialization has taken place with almost all the tooth characters and has resulted in the many diverse dentitions of the modern human populations with their attendant problems of occlusion.

SUMMARY

This paper has listed briefly six concepts from the fields of physical anthropology and comparative anatomy which are important in the understanding of occlusion as it is seen in man today. Other important concepts such as selective pressures, genetic drift, preadaptive and nonadaptive characters and so on, have not been discussed although they are important.

The dentition and occlusion of modern man are extremely variable from individual to individual and from population to population. This is the result of the operation of certain biological principles. Intensity of expression of dental characters depends on the location within the tooth groups and on the genetics of the individual. Influence of environment in development, nutrition and pathological circumstances are not to be discounted but are omitted in this discussion in order that the concepts presented not be confused. Eruptive sequences and anatomy, both contingent on genetics, are obvious agents in determining the degree of deviation from the theoretic norm or ideal. The evolutionary development of crown form and occlusal relationship manifests that dentition and occlusion are not static entities. Man's dentition is in transition and is evolving away from the much more efficient hypothetical ancestral dentition deduced from that of early man.

Variation in toothbrush textures

M. Kiplinger Hine, Jr., Oberlin, Ohio

In the first volume of the *American Journal of Dental Science*, the first journal devoted entirely to dentistry, can be found an article by C. A. Harris entitled "Cleanliness of the Teeth," in which Harris wrote:

> As it regards the kind of brush most proper to be employed, there exists a considerable diversity of opinion; some prefer a very hard one, others think a brush cannot be too soft; whilst others again, give their preference to a medium one, and to this last our own is decidedly inclined. A tooth brush should be neither *too* hard nor *too* soft. . . .[1]

Although this statement was published in 1839, it is even more true today, since the variety of toothbrushes available has been increased by the use of synthetic bristles as well as different types of natural bristles and by the addition of many different designs of toothbrush handles, heads and tufts.

There will doubtless never be one standard brush acceptable to all dentists and suitable for all patients. Most dentists are convinced that each patient should use a toothbrush, but there is not complete agreement on the type of brush the patient should use. Since this situation exists, it is probably true that as yet no one has designed an ideal brush which can be adapted by all patients to all the various technics which are recommended by dentists. Often dentists become convinced that a certain design of a brush with a certain texture of bristle is superior to all others and so recommend a specific brush to their patients. Nevertheless, even casual observations indicate that brushes themselves are not standardized; so-called "medium" brushes for one brand often have stiffer bristles than "hard" brushes of the same or other brands. Many manufacturers do not label the brush, although they do place the words "extra hard," "hard," "medium" or "soft" on the box. Such words, however, are meaningless unless defined; and no definitions can be found in the literature.

To test the uniformity of the texture of brushes, four dozen toothbrushes of similar design were bought on the open market. All brushes were of the "professional" design with tufts arranged in two rows of six tufts each and in the same general price range (49 cents to 69 cents); they represented four well-known brands.

In addition, several cheaper brushes were tested; but since their bristle texture was usually not marked in any way and since they varied widely in "stiffness," they are not included in this report.

Brushes of the following textures were tested:

	"Extra hard" bristle	"Hard" bristle	"Medium" bristle
Brand A	4 natural	4 natural 4 nylon	4 natural 4 nylon
Brand B	4 natural	4 natural	4 natural
Brand C	4 natural	4 natural	4 natural
Brand D	(Unavailable)	2 nylon	2 nylon

1. Harris, C. A. Cleanliness of the teeth. Am. J. D. Sc. Ser. 1, 1:9, 1839.

Each brush was numbered for identification, and then the handles were cut off with a hack saw so that only by referring to the number at the end of the testing could one identify the brand. Each brush was placed in a specially built Taber V-5 Stiffness Gauge,[2] and the initial stiffness of the bristles was determined.

The brush heads were inserted in the gauge (illustration, left) with one row of bristles on each side of a movable blade. The brush was then clamped solidly by tightening the thumbscrews on each side of the brush holder. The machine was adjusted to zero by alternate adjustment of these thumbscrews, and then the brush being tested was slowly tilted until the weighted blade bent the bristles to a deflection of 7.5 degrees (illustration, right). A reading was taken on the outer scale of the gauge indicating the resistance offered by the tufts of bristles to bending. Both rows of bristles were bent several times, and an average was recorded.

It is recognized that this machine is not extremely accurate; but since care was exercised to bend the bristles at the same speed and since the average of several tests was taken, it is believed that the readings are significant. It was determined that brushes which showed a difference of 4 in the readings on this machine showed differences easily discernible by digital tests. Results of tests are summarized in Tables 1, 2 and 3.

Table 1 • Stiffness of "extra hard" brushes

	Brand A	Brand B	Brand C
	56	50	47
	51	40	49
	52	35	52
	50	55	54
Average	52.25	45	51
Range	6	15	7

Table 2 • Stiffness of "hard" brushes

	Brand A		Brand	Brand	Brand
	Nylon	Natural	B	C	D
	33	44	77	53	49
	32	44	59	65	53
	34	47	63	57	
	31	45	55	57	
Average	32.5	45	63.5	58	51
Range	3	3	23	12	4

Table 3 • Stiffness of "medium" brushes

	Brand A		Brand	Brand	Brand
	Nylon	Natural	B	C	D
	26	39	41	44	49
	27	37	33	42	52
	28	35	35	45	
	30	39	34	44	
Average	27.75	37	35.5	43.75	50.5
Range	4	4	8	3	3

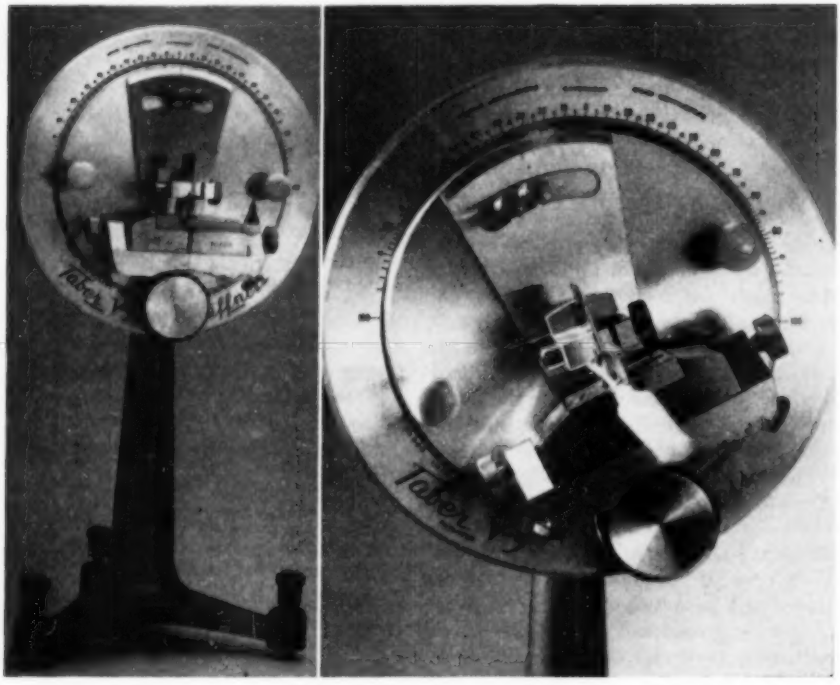
EXTRA HARD BRUSHES

In Table 1 results of tests for stiffness are given for three brands of "extra hard" brushes. It is obvious that considerable variation exists between the brushes of the same as well as of different companies. The average stiffness of the 12 "extra hard" brushes was approximately 49.

HARD BRUSHES

Table 2 summarizes results of tests for stiffness of brushes labeled "hard." It can be noted that Brands B, C and D "hard" brushes are the same or stiffer than Brands B and C marked "extra hard," also that in Brand D the brushes marked "medium" are considerably stiffer than some marked "extra hard" in Brand B. It can be noted further that there is considerable difference between a "nylon" and a "natural" brush of presumably the same stiffness in Brand A. This difference is probably desirable, because nylon brushes do not lose stiffness in water as much as do brushes of natural bristles. Likewise evident is the marked uniformity of nylon brushes, which is to be expected since the bristles are of uniform diameter. The average stiffness of the 18 "hard" brushes was approximately 50.

2. Gauge loaned by Lactona, Inc.



Taber V-5 Stiffness Gauge

MEDIUM BRUSHES

Table 3 summarizes the results from tests of four brands of "medium" brushes. Again the difference between the brush of natural bristles and the nylon brush in Brand A can be noted. The "medium" brush in Brand B is stiffer than the nylon brushes marked "hard" in Brand A. The average stiffness of the 18 "medium" brushes was approximately 39.

DISCUSSION

It cannot be said that any of the brushes tested are substandard or do not measure up to a standard, because there is no standard. As has been demonstrated, there is much variation between brands of toothbrushes.

If, for example, a patient purchases a brush labeled "hard," he might get one with fairly stiff bristles or one with quite soft bristles. This variation does not exist between brands of brushes only; in all brands tested (except perhaps one) much variation was noted between brushes of supposedly the same texture. In this study the stiffest brush tested was one marked "hard"; this particular brush was almost twice as stiff as one of the same brand marked "extra hard." In fairness, it should be mentioned that the present unsettled condition of the supply of natural bristles available to manufacturers may contribute to the lack of uniformity in brushes; but even so, the variations noted seem wider than necessary.

The nylon bristle brushes tested showed

much less variation than was found in natural bristle brushes.

SUMMARY

In tests made of the stiffness of the bristles of brushes purchased on the open market, it was observed that there is much variation in brushes of well-known brands and usually also in brushes of the same brand. Nylon bristles tested were more uniform. In addition, tests were made of several cheaper brushes, many of which were not classified as to stiffness; results indicate that no attempt was made by the manufacturers to produce a uniform product.

This preliminary study indicates that there is no standardization of toothbrush textures but that there should be. At present if a dentist recommends a certain type of brush, there is little assurance that his patient will get the texture desired.

Much information is needed before the problem of standardization of toothbrush bristles can be solved. For example, answers to the following questions are needed: How "stiff" should toothbrush bristles be? How much variation in stiffness can be tolerated? How long do toothbrushes retain their original stiffness? What factors control stiffness?

Further study is indicated to answer these questions.

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Man's Study of Man • The human system is unbelievably complex, and its examination by research calls for all the science that man has yet learned and for much which is still a closed book. All this gives zest to our endeavor. It makes the study of man by man the most challenging problem that man can conceive. There will be many researches, many papers, many lives lived, before there can emerge that integrated, complete understanding which alone can form a sound and adequate scientific base for the profession of medicine. And in the meantime we pursue individual paths, which continually diverge, which become daily more specialized; and there is danger that the pioneers on the boundary of knowledge will completely lose touch with one another, that we shall learn more and more about less and less, and that the grand design may be completely obscured by the inconsequential detail which we pile up before it. *Vannevar Bush, "We Are in Danger of Building a Tower of Babel." Public Health Reports 68:150 February 1953.*

Direct filling resins: dimensional changes resulting from polymerization shrinkage and water sorption

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Methyl methacrylate monomer shrinks approximately 21 per cent in volume during polymerization.[1] The polymer, if placed in water, expands as a result of water sorption.[2, 3] Since the direct filling resins are essentially methyl methacrylate and their method of placement requires that they be polymerized in the cavity, knowledge of the amount and location of these dimensional changes is of primary importance.

In mixing the monomer and polymer to form the direct filling resins, one third to one half of the total mix of resin made is monomer. Theoretically, therefore, the shrinkage should be 7 to 10.5 per cent in volume, depending on the amount of monomer used. In placing an actual restoration with these resins, however, the maximum theoretical shrinkage is never observed for the following reasons: (1) The polymerization reaction starts very shortly after the monomer and polymer are mixed and before the resin is placed in the cavity; hence, part of the shrinkage takes place outside of the cavity. (2) Complete polymerization does not take place in the direct filling resins; therefore the amount of shrinkage that occurs in the cavity may be reduced slightly.

In this investigation, data were obtained on the amount of polymerization shrinkage that is likely to be encountered in clinical practice and on the expansion that occurs as a result of water sorption.

VOLUMETRIC SHRINKAGE

Early in the investigation it was found that the polymerization shrinkage did not occur uniformly throughout the resin (as would a thermal contraction) but rather occurred in localized areas similar to well-known "shrinkage lakes" observed in larger specimens. For this reason linear methods of measurement were discarded. A simple dilatometer (Fig. 1) for determining the volumetric shrinkage was devised. The specimen chamber was fitted with a ground-glass stopper which allowed quick access for ease in placement and removal of the specimen. The stopper was held in place by means of a quick-opening clamp during the time each test was in progress. The diameter of the capillary tube was determined by

*Research associate, American Dental Association, National Bureau of Standards.

†Chief, Dental Research Section, National Bureau of Standards.

1. Strain, D. E.; Kennelly, R. Grice, and Dittmar, H. R. Methacrylate resins. Ind. & Eng. Chem. 31:382 (April) 1939.

2. Vernonite Work Bench 6, no. 3 (March) 1947.

3. Sweeney, W. T. Denture base material: acrylic resins. J.A.D.A. 26:1863 (Nov.) 1939.

the mercury-thread method.[4] Repeated calibrations determined by this method resulted in an average diameter of 0.662 ± 0.002 mm. By using the average diameter, a change in volume could be calculated to approximately 1 per cent.

The dilatometer was kept in a constant temperature cabinet maintained at 37 ± 0.2°C. (98.6 ± 0.4°F.). A small pellet of the resin (30 to 50 cu. mm.) mixed according to the manufacturer's directions was placed in the mercury-filled specimen chamber of the dilatometer. The chamber was then closed with the ground-glass stopper. This closure forced the pellet of resin under the surface of the mercury and caused the level of mercury to rise in the capillary tube. Since the pellet of resin was completely surrounded by mercury, any change in volume of the resin was reflected in a change in the height of the mercury column in the capillary tube. The change in height of the mercury column was measured by means of a cathetometer graduated to read to 0.02 mm., and readings could be repeated to that value. By using this measured value and the previously determined diameter, the volume change of the resin was calculated. The percentage change in volume was based on the final volume of the pellet. A series of density measurements made on several brands of resin tested ranged from 1.14 to 1.20 Gm. per cc. with an average of 1.18. The weight of the pellet was converted to volume by using this average value.

The results of this procedure are given in Figure 2, which shows the per cent of shrinkage with time after the start of the mix. The determined shrinkage is that which would occur in the cavity if the resin were placed by the pressure technic. Any shrinkage which occurs before the resin is placed in the cavity is not measured by this method.

The volumetric polymerization shrinkage measured by this method was found to vary between 6 and 8 per cent, depending on the brand of resin. Since complete polymerization does not take place and part of the shrinkage occurs in the time interval between the start of the mix and the placement in the cavity, the practical value of polymerization shrinkage thus obtained agrees well with the theoretical value of 7 to 10.5 per cent. For purposes of comparison similar experiments were made using silicate cements (Fig. 2). The shrinkage observed was approximately 1 per cent after a 30 minute interval. Silicate cements continued to shrink during the first 24 hours, while the resins remained essentially constant after the first 30 minutes. At the end of the 24 hour period, after which there was no appreciable change in either resins or silicates, the resins had shrunk approximately four times as much as the silicate cement.

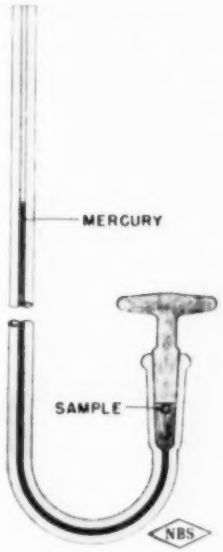


Fig. 1 • Schematic drawing of dilatometer used in determining curing shrinkage of direct filling resins

4. Fisher, Willard J. Coefficients of gas viscosity. II. Construction of apparatus. Phys. Rev. 28:73 (Feb.) 1909.

EXPANSION DUE TO WATER SORPTION

Part of the shrinkage resulting from polymerization is later compensated for by an expansion resulting from water sorption. A volumetric measurement of this expansion using the dilatometer was not practical for two reasons: (1) The actual amount of water sorbed by the pellet had to be determined by weight, and the small quantities involved made the accuracy of the weight measurement questionable. (2) Water used as the fluid in the dilatometer evaporated during the time required for the test (15 to 30 days) and introduced an experimental error equal to or greater than the change being measured.

No satisfactory technic for preventing evaporation entirely was found. For these reasons a linear method was employed. The linear measurements were made on disks of the self-curing resins similar to the disks used in the water sorption tests of denture base resins.[5] The disks were approximately 50 mm. in diameter and 0.5 mm. in thickness. Specimens were made in a stainless steel mold with a cover of chromium-plated steel on which a grid of lines had been ruled. Measurements were made between the points of intersection of the lines which were dupli-

5. A.D.A. Specification No. 12 (revised) for Denture Base Resins (acrylic resin or mixtures of acrylic and other resins).

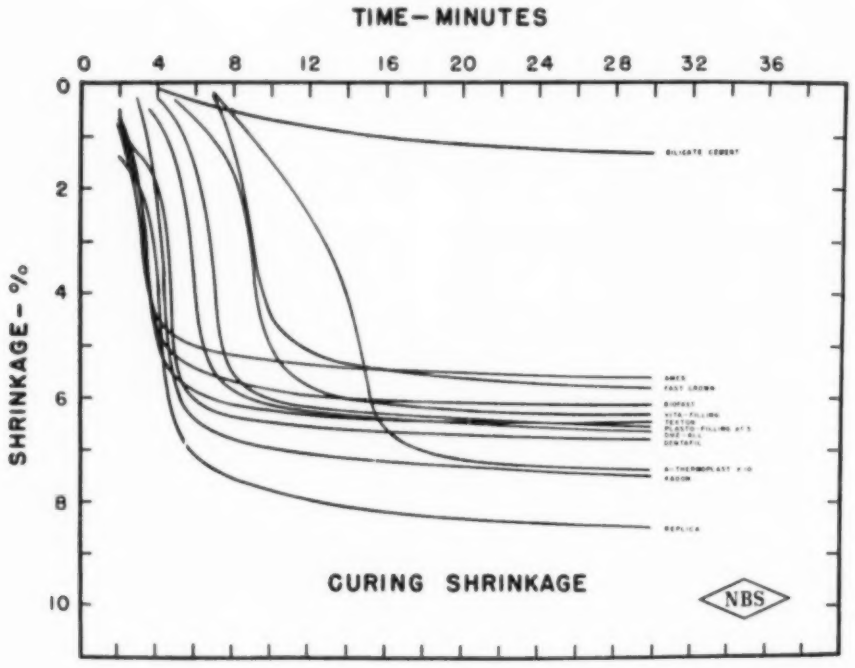


Fig. 2 • Effective volumetric shrinkage occurring when various brands of direct filling resins polymerize

cated on the disks when they were cured (Fig. 3). All readings were made to 0.0001 inch, using transmitted light on a Gaertner measuring microscope at a constant temperature of 21.1°C. (70°F.). To eliminate any error due to possible warping, the disk was placed between two pieces of plate glass while measurements were in progress. The glass plates also allowed measurements to be made with the disk surrounded by a film of water so that any change due to evaporation while the measurements were made could be prevented.

In the first series of tests, disks were made at room temperature and placed in a desiccator at 37°C. (98.6°F.) overnight. Measurements were made on specimens in the dry condition, and then the disks were placed in distilled water at body temperature. Measurements were made at varying time intervals while the disks were wet. When this procedure was followed, the resin was found to expand approximately 0.4 per cent linearly during the first 24 hours. After this maximum was reached, the resin contracted. One specimen after 18 days in water at body temperature was the same size as it was originally in the dry state. It was demonstrated that this apparent shrinkage occurred because of strain originally present and later released by water, which acted as a plasticizer. This release of strain resulted in a change in the shape of the specimen, which manifested itself in a contraction across the dimension being measured. A similar phenomenon was reported by Dahl in a study of dimensional stability of small cylinders of acrylic resins.[6] Determinations on annealed specimens did not exhibit this contraction.

Annealing was accomplished by placing the disks between pieces of plate glass in an oven overnight at 78°C. (172.4°F.). This procedure removed the strain. The expansion as a result of water sorption on the annealed specimens is shown in Figure 4, in which linear expansion is

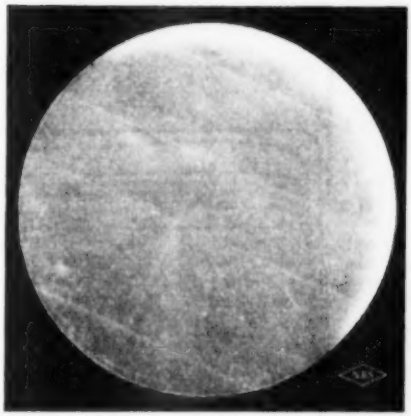


Fig. 3 • Disk of resin used in determining amount of expansion occurring as a result of water sorption; measurements made between points of intersection of lines

plotted against time. All the materials tested, with the exception of two, expanded uniformly and were dimensionally stable after about 24 hours. The expansion varied from about 0.3 to 0.5 per cent linearly, or from 1.0 to 1.5 per cent volumetrically. Variation among specimens of the same material was only ± 0.02 per cent on the linear measurement. The two materials which were not dimensionally stable after annealing were Biofast and Ames Plastic Filling Material. No explanation for their nonconformity can be offered at this time.

For purposes of comparison, specimens of heat-cured denture base resin were made in the same mold, annealed and dried to a constant dimension. Measurements were then made at various time intervals after immersion in water at body temperature. The results of this procedure also are given in Figure 4. The heat-cured denture base resin also expanded rapidly during the first 24 hours

6. Dahl, G. E. Dimensional stability of small cylinders of acrylic resins. Master's thesis, Northwestern University, 1946.

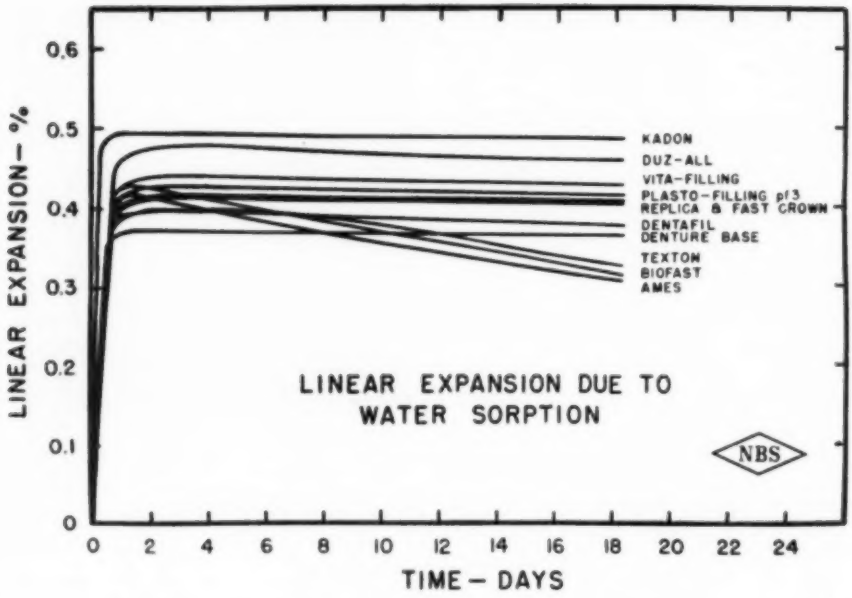


Fig. 4 • Dimensional change in various brands of direct filling resins as a result of water sorption at 37° C.

and was dimensionally stable after that time. The heat-cured denture base resin expanded approximately 0.38 per cent linearly.

CONCLUSIONS

The direct filling resins shrink approximately 6 to 8 per cent in volume during polymerization. The shrinkage does not occur uniformly in all directions but is concentrated in localized areas. This shrinkage is about four times that of silicate cement, which was found to have a shrinkage of about 2 per cent when measured under the same conditions.

If no strain is present, the direct filling resins expand equally in all directions as a result of water sorption. This expansion amounts to 0.3 to 0.5 per cent linearly, or 1.0 to 1.5 per cent volumetrically. If strain is present, the dimensional change due to water sorption is not uniform in all directions and may result in an apparent contraction in one direction.

REHABILITATION OF A PATIENT HAVING AN ACQUIRED PALATAL DEFECT

By Stanley Raynor, D.D.S., Chillicothe, Ohio

A cleft palate is a loss of continuity or a division of the palatal structure of the oral cavity.[1] The condition may occur in the hard or soft palate or in both, or it may involve both the hard and soft palates and continue forward, extending through the alveolar ridge, causing a cleft lip. A cleft palate may be a hereditary, congenital or acquired defect.

Excellent results have been obtained in many instances in the correction of these palatal defects.

Following is a description of a patient with an acquired defect of the palate which had resulted from a syphilitic infection.

REPORT OF CASE

The patient was a 33 year old white man. He had had the usual childhood diseases with no apparent sequelae. He was the eleventh of 13 children, one of whom was deceased; the other siblings were in good health. His father had died at the age of 70 from natural causes. His mother was in fair health at the age of 70.

In 1939 he had noticed a sore on his palate. He went to see a physician who diagnosed the sore as being a syphilitic lesion. He was given antiluetic treatment. In spite of this, however, the lesion progressed, and it resulted in a defect of the palate (Fig. 1). After the defect developed, the man noticed a defect in his speech which made it difficult for others to understand him.

The significant findings at the physical examinations were two oval-shaped defects in the hard palate, slightly to the right of the midline. The larger of these measured about 2.7 cm. by 1 cm. and the smaller 0.6 cm. by 1 cm. (Fig. 2, above left). Laboratory examination revealed a positive Kahn reaction.

TREATMENT

At the preliminary examination it was decided to extract all of the remaining upper and lower teeth because of the presence of periodontal disease, retained roots, and badly decayed and abscessed teeth. Two months after the extractions, an obturator denture with a clear acrylic resin palate was constructed (Fig. 2, below left) which would close and seal the naso-oral cleft, thereby preventing food from entering the nasal cavity. It also directed air from the pharynx into the mouth instead of allowing it to pass freely into the nasal cavity. The appliance was adapted to the margins of the cleft, and included the cleft, thereby stabilizing the appliance. If the patient were annoyed by the presence of the obturator, he might fail to become proficient in its use.

The obturator corrected defective consonant sounds, many of which had been omitted or distorted by their partial emission through the nose (Fig. 2, right).

The procedure in making the denture was identical with that used in the preparation of a full denture prosthesis, with the exception that a clear acrylic resin palate was used.[2]

After the patient had become accustomed to the use of the obturator, efforts were made to correct his speech defect. In order to accomplish this, a series of exercises were given[3] which were designed to accomplish the following:

1. To strengthen the soft palate and quicken its action.

1. Landa, J. S. Practical full denture prosthesis. Brooklyn, Dental Items of Interest Publishing Co., 1947, p. 291.
2. Wright, W. H. How to make cleft palate obturator of acrylic resin. In Yearbook of dentistry, 1940. Chicago, Year Book Publishers, 1940, p. 529.
3. Van Riper, C. Speech correction: principles and methods. New York, Prentice-Hall, Inc., 1947, p. 387.

Fig. 1 • Clinical appearance of palatal surfaces showing acquired defect

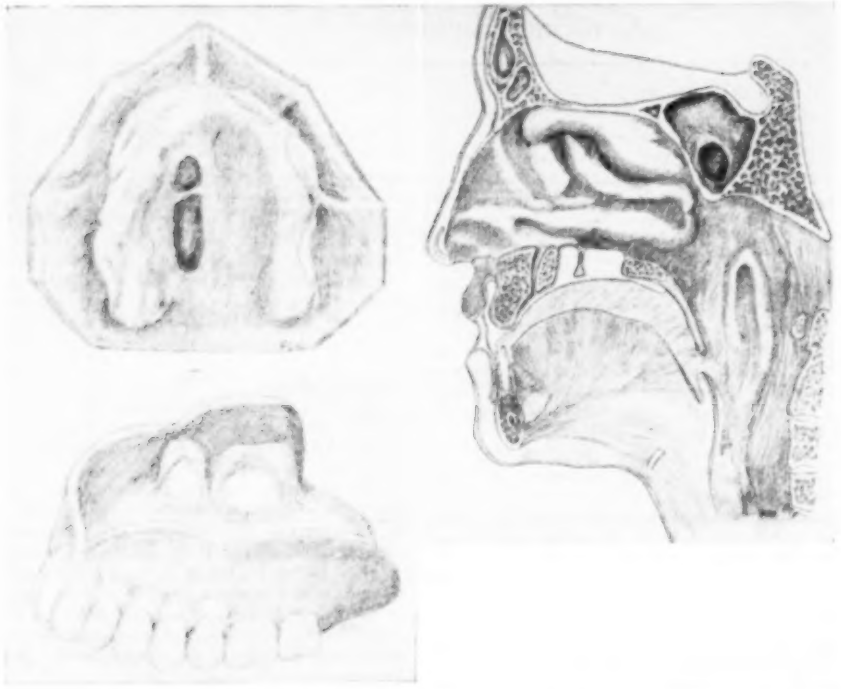


*Fig. 2 • **Above left:** Model of defect showing isthmus of tissue creating the orifices in relation to anatomic structures of palatal surface. Below left: Prosthesis consisting of full denture and obturator as an integral portion of denture. Right: Schematic drawing of prosthesis in position showing relationship to anatomic structures of oral and nasal cavities*

2. To strengthen the tongue and make it more mobile.

3. To direct vocalized air through the mouth opening instead of through the nostrils.

4. To produce the vowel sounds with less nasal tone.

5. To eliminate unsightly contractions of the nostrils.

The patient's speech is so improved by the use of the corrective appliance and by the voice training as outlined that he has gained self-confidence. He no longer feels highly conscious of his defect and enters into relationships with others more freely. Thus, the correction of his defect has proved to be a valuable aid in improving the social adjustment of this individual.

Federal Reformatory

COUNCIL ON DENTAL HEALTH

The President's Commission on the Health Needs of the Nation

On December 29, 1951, President Truman established the President's Commission on the Health Needs of the Nation. The Commission was directed to make a comprehensive study of the health care needs of the people, with particular attention to special health problems, the current and prospective supply of health personnel, the adequacy of hospital and health center facilities, current research activities in the field of health, the effect on civilian health of military requirements for health personnel and facilities, problems associated with financing health care and the extent to which government does and should participate in services in the health field. The Commission was directed also to submit recommendations for governmental action. The presidential order stated that the Commission would cease to exist within one year of its establishment.

A 15-member commission was appointed under the chairmanship of Paul B. Magnuson, M.D., professor emeritus of Northwestern University Medical School and formerly chief medical officer of the Veterans Administration. The late Ernest G. Sloman served as dental member of the Commission until his death April 30, 1952, and President Truman appointed Lester W. Burket, dean of the School of Dentistry, University of Pennsylvania, as his successor. In addition to Dr. Magnuson, there were five other physicians on the Commission as well as representatives of the nursing profession, labor unions, farm organizations, hospitals and the general public.

One year later, on December 18, 1952, the Commission presented its findings and recommendations to the President. The comments that follow are based on an analysis of Volume I of the Commission's report. The first volume contains a summary of the findings and the specific recommendations; the other four volumes deal with the details of the findings which led to the recommendations, with the statements which were presented to the Commission at both the Washington and regional hearings and with statistical material.

The recommendations did not always represent unanimous opinions of Commission members, and dissenting statements appear in various parts of the report. The following digest and comments do not cover all specific points in the report; however, the principal recommendations of the Commission and those aspects of the report which will be of particular interest to the dental profession are presented.

1. *Measuring Needs for Health Care* • The Commission recognized that, except for communicable diseases reportable by law, there is a paucity of data on the occurrence of various forms of illness. It recommended that the federal government develop and utilize adequate methods for measuring morbidity in the general population.

Comment • The survey conducted by the Association's Bureau of Economic Research and Statistics in 1952 on the need for dental care is one example of the type of study recommended by the Commission. Because of the methods used in studies of the prevalence of dental caries, the dental profession has gathered a tremendous amount of objective evidence on the occurrence of this disease. However, satisfactory methods have not been developed for measuring the extent of malocclusions, periodontal diseases and dental defects other than dental caries. The inauguration of more widespread methods for the prevention and control of these defects waits, to a large extent, on the development of effective and practical technics for measuring incidence and prevalence.

2. *Needs for Dental Care* • Dental health is listed as one of five special health problems, along with chronic illness, mental illness, environmental health and accidents. The introduction to this section states, ". . . we must note that some health problems are of such magnitude or of such a unique nature that they require special efforts for their solution." [56*]

The report stated that

> . . . an array of shocking evidence established the high priority which dental care deserves among the health needs of the American people. Sufficient dental care either is not available or is not utilized by the American people to a degree even approaching an adequate level.

At the conclusion of the discussion of dental needs, the report recommended that:

> (1) Dental care be considered an essential component of comprehensive health service, to be made available for children immediately, and for the entire population as rapidly as possible. (2) All communities bring the fluoride content of their communal water supplies up to an optimum level for the prevention of dental caries, and that individual preventive dental procedures likewise be promoted. (3) More efficient methods of dental practice, including the more general use of dental assistants and dental hygienists, be undertaken. (4) Increased research into dental disease be supported. [60-61]

Comment • Although this portion of the report does not specify how dental care should be made available, the principle appears to follow the policy of the Association which states that "Dental care should be available to all regardless of income or geographic location as rapidly as resources will permit." For many years, the Association has emphasized the need for giving priority to treatment, prevention and control of dental disease in children and has stated that the community, in all cases, should determine its methods for providing services.

The dental profession strongly advocates a more widespread application of all known preventive measures and is presently giving particular attention to the fluoridation of public water supplies. The House of Delegates of the Association, in 1950, re-emphasized the dental profession's interest in the more effective and more general use of dental assistants and dental hygienists. The Association repeatedly has demonstrated its interest in dental research through its generous appropriations and through its efforts to secure government and private grants for that purpose.

3. *Research* • The report recommended increased dental research [61] and noted that "Dental research leading to the control of dental disease, an urgent need, waits principally upon the development of trained investigators." [15]

One section of the report dealt entirely with "medical research" [39] and, although dentistry was not mentioned, the term "medical," in reports of this nature, usually is intended to include dentistry. The report stated that 66 per cent of medical research is now supported by government and that the total medical research expenditure of $180 million in

*Numbers in brackets refer to pages in Volume I of the report.

1951 was quite insignificant in comparison to other national expenditures. It stated that the amount of money spent on medical research is entirely out of proportion to the cost of illness and the magnitude of the health problems needing intensified research.

The recommendations were that both government and private support should be increased, that monies should be allocated to many agencies and individuals as well as to medical institutions, that more money should be allocated for long-term projects, that particular emphasis should be given to research on mental illness and chronic illness, and that administrative research should develop better methods of utilizing physical plants and health personnel so that they may deliver more and better health services. [42]

Comment • Funds available for dental research activities are considerably out of proportion to the size of the dental health problem and to the money spent in other areas of health research. Although the development of trained investigators is highly important for the progress of dental research, there also is an urgent need for expanded physical facilities, particularly at the National Institute of Dental Research and in dental schools and for increased financial support of dental research projects. The development of trained dental investigators is deterred by the induction of promising young men into the military services. The Commission's recommendations for research are consistent with Association policy, and actions to implement these recommendations, particularly those dealing with dental research, will have the full support of the dental profession.

4. *Health Personnel* • "The cry for more personnel was sounded at almost every panel and at every public hearing held by this Commission . . . the people asked for more physicians, nurses, dentists, public health personnel and auxiliary medical workers." The report noted that the production of these health workers is "taking place in fits and starts with no over-all plan and only a limited amount of long-range planning. We see no prospect for a great increase in the number of health workers in the near future." [11]

The Commission expressed a fear that the present shortage of dentists will become greater with increased demand for dental services brought about by more widespread dental health education and the inclusion of dental services in prepayment plans. It stated that fluoridation probably will not affect significantly the number of dentists required during the years immediately ahead but may serve to offset the steadily increasing demand for dental service from our aging population. [15]

A résumé was presented of estimates of future shortages in the dental profession and the capacity of the dental schools to produce additional dentists. The report cited the financial plight of dental schools which was emphasized in the recent study by the Association and the Public Health Service and stated that "In many ways the financial condition of our dental education system is even more critical than that of our medical school system."

Among the approaches required to solve the problem of increasing the supply of dentists, according to the report, are:

> (1) Expanding the schools which have adequate facilities and faculties to maximum enrollments; (2) Developing new schools, preferably on a regional, inter-state basis; (3) Removing economic and geographic barriers which stand in the way of the enrollment of many qualified candidates; (4) Increasing use of dental hygienists and other auxiliary dental workers. [17]

Additional recommendations of the Commission were for federal grants to supplement other financial support for schools of medicine, dentistry, nursing

and public health, for physical facilities, operating costs and the development of new schools. (The report warned that there should be no federal control over the schools.) It added that federal scholarships should be available for students not otherwise able to afford education in the health professions and that there should be no discriminatory bars to negroes seeking training in the health profession. [21]

Comment • In its statement of the shortage of dental personnel, the report failed to distinguish between the unmet needs for dental care for all persons and the actual demand for dental services. This distinction was emphasized by the advisers at the Washington hearings but was not considered in the estimates of the shortage of dentists, with the result that the shortage appears much more acute than it is. Some of the figures on the supply of dentists are not the same as those available to the Association, and an analysis of the figures cited fails to support some of the conclusions of the report. Any suggestion that the dentist-population ratio in states with low ratios be brought up to the national average would have to be made on the assumption that these areas have the economic resources to support additional dentists and have a level of dental health appreciation to insure a demand for dental services.

The dental education program in this country is geared to an anticipated increase in demand for dental services: enrollments have increased in recent years; three new schools have been started since World War II; one new school will begin taking students in 1953 and another in 1955; legislation has been enacted authorizing four additional schools, and plans are being made for four more. There are now 29 schools for training dental hygienists, 13 of which were started since World War II and three of which were started in the last year (1952).

It is agreed that the financial condition of many dental schools is serious; however, it is doubtful if it is more critical than that of other professional schools. The Association approves the federal support of dental education programs, provided that such funds when appropriated should be accepted only with the understanding that the government shall not exercise any control over, or prescribe any requirements with respect to, the curriculum, teaching personnel, or administration of any school or the admission of applicants thereto. Similar safeguards must be assured in the event that federal aid is made available to dental students.

5. *Hospitals* • The Commission recommended an expansion of the Hill-Burton Act, providing for federal grants to states for the construction of hospitals. [28] This recommendation was supported by an estimated need for almost doubling the present number of hospital beds. [24]

The shortage of hospital beds is made more acute, according to the report, by the requirement of many prepayment plans that persons must be hospitalized bed patients in order to receive indemnified services. [26]

Another recommendation solicited "vigorous public and professional support . . . for the strengthening of hospital licensure and accreditation programs." [28]

Comment • The Hill-Burton Act provides funds on a grants-in-aid basis, a principle which is in accordance with Association policy.

The inadequacies of physical facilities together with the lack of administrative authority for the provision of dental care in hospitals in most states is, currently, of particular concern to the Association. More hospitals should make provisions for complete dental services wherever local conditions warrant. The dental profession is giving vigorous support to hos-

pital licensure and accreditation programs as they relate to the provision of dental services and to the training of dentists through internships and residencies.

6. *Organization of Health Services* • The Commission expressed a deep concern about the need for better organization in the distribution of health services. The report stated that,

> The genius for organization, so characteristic of American life in general, is conspicuous in health services by its absence. By organization is meant the process of putting together people and facilities and utilizing them in the most efficient manner. [29]

The report dealt principally with defects in organization of medical and public health services, but several of the deficiencies cited apply also to the dental field. Some examples are the isolation of small communities from the main stream of fast-moving medical (dental) developments; isolation of urban medical centers, staffs and students from everyday practice; failure to utilize wisely and fully the time of professional health personnel; lack of proper utilization of modern diagnostic and therapeutic equipment; and sketchy and inadequate public health services. [29]

As partial solutions to these problems, the Commission recommended regional coordination of hospitals, health departments and medical schools; federal grants-in-aid for local health departments; federal categorical grants to aid the development of chronic disease control and other new aspects of public health; and a comprehensive survey of the practice of the general physician. [38] One of the principal recommendations was for the further development of group practice which was defined as the association of physicians of various skills and, sometimes dentists, "for the purpose of rendering a more complete and balanced health service." [33] Federal loans to local organizations were recommended to assist in the development of group practices offering prepayment arrangements for patients.

Comment • The Association has supported grants-in-aid bills for the development of local health departments, and the Commission's proposal for federal categorical grants for new aspects of public health is consistent with the Association's recommendation for earmarked funds to the states for dental public health. The Commission's proposal for a comprehensive field study of the practice of the general physician is similar to, though not as broad in scope as, the survey of dentistry presently being considered by the Association.

Although there are a few group dental practices, there is no evidence to indicate that their widespread use would materially improve efficiency or the availability of dental care. A small number of group health plans are providing dental services on a prepayment basis, but these plans employ dentists on salary, and it is doubtful if they are consistent with most dentists' preference for a method of practice.

7. *Personal Health Services* • Probably the most critical part of the Commission's report dealt with the financing of personal health services. The report reviewed several methods and concluded that prepayment is the most feasible method of financing the costs of health care. [47]

"One of the objectives of comprehensive prepayment plans should be the inclusion of complete dental health services as rapidly as possible." [44] The report also stressed the importance of free choice of physician, freedom for the physician to treat in the manner he deems best under a system of remuneration satisfactory to the profession. [45]

The Commission recommended a cooperative federal-state program to assist

in financing personal health services. The plan provided for: [47-48]

1. A prepayment program, partially financed by federal grants-in-aid, with certain minimum federal standards.
2. Use of public or private agencies and resources or a combination of them.
3. Establishment of administration authority at the state and local level.
4. Health benefits for beneficiaries of Old Age and Survivors Insurance Program.
5. Allocation of federal funds on a matching basis to states for health care for recipients of public assistance.
6. Federal grants-in-aid for personal health services for the general population, particularly for low income groups not on public assistance.
7. Services to all persons eligible for public assistance with no means test at the time care is needed.
8. Free care for all patients in state and local government tuberculosis and mental hospitals.
9. Prepayment plan payroll deductions for government employees.
10. Eventual provision for home-town care for the Indians and for those veterans with service-connected disabilities requiring short-term treatment.

The Commission proposed that the plan be tried on a pilot basis in several regions, that it should not be immediately adopted on a national scale. In regard to compulsory federal health insurance, the Commission stated that: "It must receive further study and consideration as a possible solution to the problem." [46]

Comment • There is good reason to believe that the plan outlined by the Commission bears considerable resemblance to the Wagner Bill of 1939 (S. 1620).

Although it appears that the Commission rejected national compulsory health insurance involving the general population, for the present at least, it can be argued with good logic that the inclusion of OASI beneficiaries under a national system of health care is a form of national compulsory health insurance. A national plan which would include federal employees on a payroll deduction basis, however, might be either a compulsory or voluntary system.

The report stated that there should be no means test at the time care is needed for persons eligible for public assistance. This provision is not clear, inasmuch as the original establishment of eligibility should include a determination of a person's ability to pay. Another provision that is not clearly defined is for federal subsidy for personal health services for the general population.

The determination as to whether a specific plan would be acceptable to the American people can be made only on the basis of the specific provisions of proposed, enabling legislation.

The Association has recommended for several years that experimental prepayment plans for dental services should be inaugurated by dental societies. Prepayment plans are intended to help individuals finance dental health service costs and thereby encourage the practice of regular dental care. Considerable evidence demonstrates that regular maintenance dental care, as contrasted with haphazard dental visits for the treatment of accumulated defects, results in better dental health, in a significant saving of dental personnel time and a saving in cost to the patient. Such regular care is particularly rewarding if begun in early childhood and continued throughout adult life.

The meaning of the term "prepayment," as used by the Commission, is not restricted to a system employing the insurance principle of a calculated risk but applies to all health services whether insurable or not. The dental profession has been interested in experimental plans which would differentiate, on an actuarial basis, those dental services which are insurable (probably surgical procedures)

from those which are uninsurable (prophylaxis, for example, since there is no "risk" of need for such service). There is an urgent need for the early development of such experimental plans.

8. *Armed Forces and Veterans Health Services* • The Commission recommended a more intensive study of the problem of health personnel for military forces, the development of a clear-cut policy concerning care of military dependents, proper utilization of military health personnel and revision of Public Law 779 for a more equitable drafting of physicians, dentists and veterinarians. It recommended for veterans a clear-cut policy on the responsibility of the federal government for health services, especially for non-service-connected disabilities and preference for home-town health care, including hospitalization.

9. *Federal Department of Health and Security* • The Commission recommended that "The Congress establish a Department of Health and Security." The department would have cabinet status, but the report did not indicate clearly what its functions would be and how much of the government's responsibility in health and security it would embrace. It did specify that military and veterans' health services should not be included in the new department.

Comment • The Association has long been in favor of a federal department of health with cabinet status, established independently of welfare and educational agencies and administered by persons qualified in the health sciences. The Association's recommendation would include in the federal department of health all federal health activities except those of the military.

SUMMARY

The Commission's recommendations of particular interest to the dental profession were based on the principle that dental care should be available to all people. Included in the report were recommendations for intensified dental research; increased application of preventive measures, including fluoridation; a greater use of auxiliary personnel; federal aid to dental schools and scholarships for students; the development of more group practices; the strengthening of local health units; the inauguration of dental prepayment plans that would operate through a broad system of federal support of personal health services; more clear-cut policies on dental health services for the Armed Forces and veterans; and a federal department of health and security.

Many of the recommendations are consistent with policies of the American Dental Association and will receive the full support of the dental profession. Other recommendations and observations of the Commission are open to serious question, but the determination as to whether specific plans designed to implement the Commission's proposals will be acceptable to the American people can be made only on the basis of the specific provisions of proposed enabling legislation.

The American Dental Association is deeply interested in the examination of all health problems that affect the people of this country, particularly those in the dental field, and the Association offers its facilities to government in the development of plans of action. It is to be regretted that the dental profession was not invited to express its views sufficiently to the Commission, particularly during the hearings devoted to the financing of health care. Because of this exception, important aspects of the financing of dental care were not considered by the Commission.

The objectives of the Commission, as enumerated in the report, are commendable, and many of the recommendations will be supported by the general public

and by the health professions. However, it should be pointed out that the health professions have made many of the same proposals to government on numerous occasions.

Perhaps the greatest contribution made by the Commission has been in its continued re-emphasis, largely by implication, of the fact that sound health programs cannot be devised or administered by government without obtaining the partnership and confidence of all the health professions whose services will be required to operate the programs.

ACTION OF BOARD OF TRUSTEES

The Board of Trustees of the Association at its February 27, 28 meeting, in considering the report of the Council on Dental Health, approved the following resolution submitted by the Council:

Whereas, the general objectives set forth in the Report of the President's Commission on the Health Needs of the Nation are broadly in accord with principles established by the American Dental Association, and

Whereas, the American Dental Association is always prepared to explore every available avenue which would lead to the improvement of the dental health of the people of the United States, therefore, be it

Resolved, that the extent of the Association's support of specific recommendations in the Report of the President's Commission will be determined after exact legislative language of the proposals becomes available, and be it further

Resolved, that the Association will oppose the inclusion of OASI beneficiaries in the proposed program of personal health services on the grounds that it is an undesirable form of compulsory federal health insurance to which the Association has traditionally been opposed.

Dental care programs for indigent children and administration of dental welfare programs

The Council on Dental Health has made a study of the various aspects of dental welfare programs for the purpose of analyzing the problems with which the dental profession is confronted in rendering dental services for recipients of public welfare.

Late in 1952 the Council sent a questionnaire to dental health directors regarding (1) the conduct by their departments of dental care programs for indigent children; (2) the agencies administering dental welfare programs in their states, and (3) their attitudes relative to administration of dental welfare programs by state health departments. Replies were received from 33 states.

The states included in the study were representative of the United States for regional distribution, size and agricultural or industrial character. A statistical analysis of the replies received was made by Eleanor L. Richie, a member of the Research and Report Service of the Colorado State Department of Public Health, in collaboration with Robert A. Downs, a member of the Council on Dental Health. The details of the analysis and a statement recommending a course of action will be presented in the 1953 annual report of the Council.

REGIONAL CLASSIFICATION

The 33 states covered by this report were:

New England: Massachusetts, New Hampshire, Rhode Island.

Middle Atlantic: New York, Pennsylvania.

South Atlantic: District of Columbia, Florida, Georgia, Maryland, Virginia.

East North Central: Illinois, Indiana, Michigan, Ohio, Wisconsin.

West North Central: Iowa, Kansas, Minnesota, Missouri, North Dakota.

Mountain: Colorado, Idaho, Montana, Nevada, Utah, Wyoming.

East South Central: Kentucky, Tennessee.

West South Central: Louisiana, Oklahoma, Texas.

Pacific: California, Washington.

STATISTICAL ANALYSIS

Working independently, two individuals —a dental health director and a research analyst—classified the data on the basis of the administering agency and on the basis of the attitudes of the state dental health directors. The two studies were found to be in close agreement regarding categories, and the final classifications shown in Tables 1 and 2 were adopted.

DISCUSSION

Twenty of the 33 reporting state health departments were conducting some programs of dental care for indigent children, and three others were providing consultation or aid for local programs of this type.

Fourteen of the 33 state dental health directors either indicated an open attitude or withheld their views regarding the desirability of state health department administration of dental welfare programs. Of the other 19 reporting dental health directors, 11 favored health department administration of such programs and eight apparently favored welfare department administration.

Five of the 33 reporting state health departments were administering the dental welfare programs. The dental health directors of three of these departments indicated that they favored this plan; two of them did not express their views.

In 23 of the 33 reporting states, the state health departments were not administering the dental welfare programs; and in five other instances, the admin-

Table 1 • State health department status regarding dental care programs for dentally indigent children and attitudes of state dental health directors regarding state health department administration of dental welfare programs. (Thirty-three reporting states, 1952)

State health department status regarding dental care programs for indigent children	Total reporting	Attitude of state dental health director regarding administration of dental welfare programs			
		Favors health dept. admin.	Favors welfare dept. admin.	Indefinite—depends on circum.	No views expressed
Total states reporting	33	11	8*	8†	6
State health dept. conducts programs	20	9	1	5	5
Programs and admin. of dental welfare programs	5	3	0	0	2
Programs only‡	15	6	1	5	3
State health dept. does not conduct programs	12	1	7	3	1
But provides consultation and/or aid for local programs	3	0	0	3	0
Programs conducted by other agencies	9	1	7	0	1
Unknown status as to conduct of programs	1	1	0	0	0

*In two instances, it was recommended that the program be under a dentist.

†In two instances, the importance of local "autonomy" or local decision was emphasized.

‡Includes five states not definitely reporting the agency administering dental welfare programs.

Table 2 • Agency administrating dental welfare programs and attitudes of dental health directors regarding state health department administration of dental welfare programs. (Thirty-three reporting states, 1952)

Agency administering dental welfare programs	Attitude of state dental health director regarding administration of dental welfare programs				
	A. As to agency				
	Total reporting	Favors health dept. admin.	Favors welfare dept. admin.	Indefinite—depends on circum.	No views expressed
Total states reporting	**33**	**11**	**8**	**8**	**6**
State health dept. administers	5*	3	0	0	2
State or county welfare dept. and/or dept. of institutions administer	23†	6	7‡	8§	2
Not definitely reported	5	2	1	0	2
	B. As to change				
	Total reporting	Favors status quo	Favors change to health dept.	Indefinite—depends on circum.	No views expressed
Total states reporting	**33**	**10**	**6**	**11**	**6**
State health dept. administers	5*	3	0	1	1
State or county welfare dept. and/or dept. of institutions administer	23†	7	6‡	7§	3
Not definitely reported	5	0	0	3	2

*Two states emphasized that health department administration is required by law; in two other states, however, health department administration apparently resulted from absence of a welfare department program.

†In one state, the administration is under the welfare department but the health department checks the quality of the care provided.

‡In two instances, it was recommended that the program be under a dentist.

§In two instances, the importance of local "autonomy" or local decision was emphasized.

istering agency was not definitely stated. Of the 23 dental health directors in state health departments not administering the dental welfare programs, six favored health department administration of such programs; seven appeared to favor welfare department administration, and ten expressed indefinite or no views on the subject.

As might be expected, there appeared to be some correlation between the *status quo* of the agency administering the dental welfare programs and the attitude of the dental health director regarding the suitable agency to do so. Of the 33 reporting directors, ten apparently favored retaining the *status quo;* six seemed to favor shifting administration of dental welfare programs from welfare departments to state health departments, and 17 either had an open attitude or withheld comment.

BRIEF SUMMARY

Two thirds of the reporting state health departments were conducting some program of dental care for indigent children.

Exclusive of the instances of indefinite attitudes and unexpressed views, the statistics indicated a division of opinion regarding the desirability of state health department administration of dental welfare programs, the preference being somewhat stronger for health department administration. The data supplied for the statistical analysis, however, did not permit interpretations of the nature or scope of recommended health department administration of dental welfare programs.

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The film reviewed in this article is on operative dentistry, one of the subjects in popular demand, according to film library statistics. It is divided into four parts and each part is on a separate reel. The film may be rented as a unit for $2.50 from the Association Film Library. Since the number of prints necessarily is limited, it is suggested that film users plan their programs far enough in advance to insure availability.

All requests for film information or film, slide and filmstrip bookings should be directed to the Association Film Library, 222 E. Superior St., Chicago 11, Ill., and not to the servicing agency.

FILM REVIEWS

Operative Dentistry • 16 mm., color, sound. Part a, Rubber Dam, 300 feet, showing time 8 minutes; Part b, Cavity Preparation, 300 feet, showing time 8 minutes; Part c, The Matrix, 400 feet, showing time 10 minutes, and Part d, Amalgam Restoration, 400 feet, showing time 10 minutes. Produced in 1948 by the Department of the Navy, Bureau of Medicine and Surgery, Dental Corps, Washington, D. C. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, and from the Department of the Navy, Bureau of Medicine and Surgery, Dental Corps, Washington 25, D. C. Procurable for purchase from the United World Films, Inc., 1445 Park Ave., New York.

Part a: Rubber Dam • This part demonstrates the use of the rubber dam. It shows how the operator cuts a piece six inches wide and punches holes. The width of the dam varies with the size of the arch or quadrant to be isolated. During the cutting and punching process, the narrator discusses the properties of the rubber—its color and resiliency. This is followed by a sequence on the various kinds of clamps that can be used. The film concludes with the application of the rubber dam.

Part b: Cavity Preparation • This part shows the preparation of a cavity in an upper left first molar. The demonstration is supplemented by animated models to give close-up views of the cavity forms. The film opens with a study of the anatomy of the tooth. This is followed by a discussion of the various steps involved in cavity preparation. Precautions to be taken in order to insure the complete removal of carious dentin are also mentioned. The method of inserting the base material, zinc oxide and eugenol, is demonstrated. After margin trimmers are used, the tooth is ready for the amalgam.

Part c: The Matrix • This part shows how to make a matrix and apply it to a prepared tooth. Animation is used to demonstrate some reasons for the failure of amalgam which results from faulty matrix application. Low fusing impression compounds are used as reinforcing agents. The film concludes with the application of a matrix.

Part d: Amalgam Restoration • This part shows the preparation of the amalgam and its insertion. The trituration of the amalgam by electrical means is illustrated. The dangers of contamination from improper handling are carefully noted. Manual and mechanical condensation are compared, preference being given to the mechanical. The film concludes with the insertion of the amalgam, checking of the patient's occlusion and the polishing of the restoration.

This series is well presented. Each part opens with an introduction to the subject to be discussed and concludes with a summary. The narration is clear and the fact that each part is on a separate reel facilitates its use in a course on operative dentistry in dental schools. The series therefore can be presented in its entirety as an introduction or as a review. It can be used separately for more intensive study of the various operations. The photography is very good. All of the intraoral shots are clearly visible. The use of roentgenograms, diagrams and animation increases its instructional value. This film is suitable for dental students and general practitioners.

COUNCIL ON LEGISLATION

Dental program of the Veterans Administration

Since 1947 the Veterans Administration home town dental care program has occasioned constant discussion among members of the dental profession. More recently questions have been raised about the nature and extent of the entire dental benefit program of the Veterans Administration. In order to give the members of the dental profession a comprehensive picture of the size of that program, the Council on Legislation herewith reprints a statement presented on February 25 by John E. Fauber, Assistant Chief Medical Director for Dental Service of the Veterans Administration to the Veterans Affairs Committee of the House of Representatives.

THE OUTPATIENT DENTAL PROGRAM

From July 1, 1946, to January 31, 1953, a period of approximately 6½ years, more than 5 million applications for VA outpatient dental treatment were made by veterans. Approximately 3½ million cases were examined and 2½ million cases treated. The value of the work completed by staff dentists and the cost of the work done by fee-basis dentists is in excess of $260 million. This amount, however, probably represents only a small part of the possible ultimate cost of the outpatient dental treatment program, since only a small segment of the potentially eligible veteran population has applied for treatment to date. It should be noted that the great majority of those who have applied are eligible for continuous retreatment.

During these 6½ years almost 3,800,000 veterans have applied for outpatient dental care at least once, and about 80 percent of them (approximately 3 million) have been determined eligible. However, the Veterans' Administration estimates that the number of veterans potentially eligible to receive outpatient dental care ranges from more than 11 million to 16 million. This number of eligibles is currently being increased at the approximate rate of 1 million veterans per year. Most of these veterans are entitled to continuous treatment for service-connected and related adjunct dental conditions (and as a result represent a growing burden to the taxpayer).

Care of the veterans' legitimate demands for outpatient dental treatment in recent years has generally required more money than the Federal Government has provided. In fiscal year 1953, several hundred thousand veterans will fail to receive the care to which they are entitled by law, because the funds provided will fall short of actual requirements by some $24 million.

Obviously, a situation has developed whereby Congress, on one hand, has given to the veteran certain legal benefits entitling him to dental treatment for service-connected conditions, and, on the other hand, has not appropriated sufficient funds to provide adequately for the administration of such benefits. It is only fair to the veteran that Congress either take these benefits seriously enough to appropriate sufficient funds or reduce the benefits in accordance with what Congress is willing to appropriate.

LEGAL BASIS FOR THE PROVISION OF OUTPATIENT DENTAL TREATMENT

The laws and regulations under which the present program is approved are as follows:

(a) The basic legislation granting medical and hospital treatment to veterans for disabilities incurred in line of duty and to veterans of any war is incorporated in Executive Order VA Regulation 7A, issued under the authority of Public Law 2, 73d Congress.

(b) Public Law 791, 81st Congress entitles veterans of the Spanish-American War, Boxer Rebellion, and Philippine Insurrection to outpatient treatment for any physical disabilities including outpatient dental treatment.

(c) Public Law 28, 82d Congress, provides the same benefits to veterans in active service after June 27, 1950, as are afforded to veterans of wartime service.

VA Regulation No. 6123 has established the following classes of beneficiaries who may be authorized outpatient dental treatment:

Class I: Those having service-connected compensable dental disabilities.

Class II: Those having service-connected noncompensable disabilities.

Class III: Those having a dental condition not service connected but medically determined to be aggravating a systemic disorder that is service connected.

Class IV: (Does not apply to outpatient treatment.) Those receiving domiciliary care.

Class V: Those pursuing a course in vocational training authorized under Public Law 16, 78th Congress, as amended, who require dental treatment to prevent interruption of training.

Class VI: Persons who served in the Spanish-American War, Boxer Rebellion, and Philippine Insurrection eligible under Public Law 791, 81st Congress.

Class VII: Persons who served on or after June 27, 1950, eligible under Public Law 28, 82d Congress (Korean veterans).

INPATIENT DENTAL CARE

It should be pointed out that the Veterans' Administration also provides extensive dental care to bed patients in hospitals under the legal authority which has been previously cited. The hospitalization of veterans for dental diseases or conditions which require inpatient care has the same priority as hospitalization for any other morbid condition.

Consequently, any living veteran, not dishonorably discharged, is potentially eligible although the frequency of such cases is low. During a recent year about 2,000 patients were discharged from hospitals by the Veterans' Administration after admission specifically for dental care.

Also, any veteran admitted for hospitalization is eligible for complete dental examination as an integral part of a physical examination. Approximately 500,000 veterans annually fall into this category.

However, eligibility for inpatient dental treatment is limited, with one exception, to those patients for whom such care will have a direct or material bearing on the physical disability necessitating hospitalization.

The excepted group includes patients with chronic disability requiring long hospitalization. For these patients, dental care involves that necessary treatment to keep their mouths in a clean and healthy condition and with sufficient dentition to provide adequate mastication.

This excepted group, of course, is composed primarily of patients hospitalized for tuberculosis, neuropsychiatric conditions, or long-term general medical and surgical conditions, and members in VA domiciles.

At any time, approximately 60 percent of the 100,000 patients in the VA hospitals and all of the 17,000 members in the domiciles are in this group.

ESTABLISHMENT OF VETERANS' ELIGIBILITY

As indicated, inpatient dental care may be administered to VA bed patients in instances where the patients' condition may or may not be service connected. However, with the few exceptions hitherto outlined, all outpatient dental treatment must be related in some fashion to a service-connected dental or medical ailment.

To establish eligibility for outpatient dental treatment, a veteran must make application to the Veterans' Administration. It is the function of the VA Adjudication Division—not the VA Dental Service—to determine whether or not the veteran's dental disabilities were incurred in or aggravated by his military service. When an application is received, the Adjudication Division obtains the veteran's service records to determine the veteran's dental history in the Armed Forces. Each tooth of the veteran is considered separately. If the veteran is found to have developed a dental disability in the service, then service connection for the individual tooth, or teeth, is granted. After the veteran's claim has been adjudicated, the Dental Service is notified of the decision, and dental treatment is authorized for those dental disabilities found to be service connected.

In order to eliminate delay in rendering out-patient treatment to persons who served on or after June 27, 1950 (i.e., Korean veterans), VA Technical Bulletin 10A-303 provides for out-patient dental treatment pending adjudication of claims of those veterans who apply within 1 year after separation from service and for whom dental disease is shown to exist within that year. This technical bulletin was initiated to provide Korean veterans with the same prima facie eligibility consideration afforded veterans of World War II.

As has been previously pointed out, the Veterans' Administration has estimated that today there are between 11 million and 16 million veterans who are potentially eligible for out-patient dental treatment. These include 95,000 veterans of the Spanish-American War, between 1,900,000 and 2,700,000 veterans of World War I, between 8,400,000 and 11,800,000 veterans of World War II, and approximately 1,400,000 veterans who served on or after June 27, 1950.

If all the veterans now potentially eligible applied for treatment at least once during

their lifetime, the bill to the Government would be approximately $1,400,000,000. However, as previously indicated, most of these veterans would be eligible for continuous retreatment (in fact, during the past 6½ years there were more than 1,200,000 applications for retreatment), so that the total eventual money bill could become a matter of several billion dollars.

STATISTICAL EXPERIENCE

Statistically, the number of applications for out-patient dental treatment received annually has varied from almost 600,000 to slightly more than 1 million. The million peak was achieved during fiscal year 1947, following the release of the great majority of the World War II servicemen who were granted prima facie eligibility for dental outpatient care for a 1-year period following their discharge from military service. Another peak occurred in fiscal year 1950 when some 800,000 applications were received. This peak was largely due to a minor economic recession in the midwinter of that year which produced some 60,000 applications above the number expected. (This recession also had its effect in increased application rates for other VA benefits as well as for VA dental treatment.)

After dropping to a low point—slightly less than 600,000 in fiscal year 1951—dental treatment applications again resumed an upward trend. This year 715,000 applications are expected, and in fiscal year 1954 the number should be larger. An important factor in this upward trend is the Korean veterans. Last fiscal year there were approximately 50,000 Public Law 28 applications. During the first 7 months of the current fiscal year we have received 115,000 such applications. These Public Law 28 veterans appear to be well informed as to their rights. Although they form only a small segment of the total veteran population, less than 10 percent, approximately one-third of the current monthly applications are being made by them.

The number of repeat applications, that is applications made for purposes of retreatment, has risen sharply over the past 6 years. In fiscal year 1947, repeat applications constituted less than 3 percent of total applications. During the past fiscal year 44 percent of the applications made were for purposes of retreatment, and today almost one-half of the applications made by veterans other than those in the Public Law 28 group are for retreatment.

Since the end of World War II, the Veterans' Administration has not had a staff of dentists in its own clinics large enough to dispose of the influx of applications nor would it have been possible to recruit sufficient personnel to maintain a system of inservice clinics large enough for this purpose. As a result, it has been necessary to purchase the greater part of the dental work from private dentists on a fee basis. (Almost 62,000 private dentists indicated a willingness to participate in the VA dental treatment program in fiscal year 1952.) Since fiscal year 1946, private dentists have made almost one-half of the dental examination cases and an even higher proportion (84 percent) of the dental treatment cases at a cost of $215 million for clinical services. Since the end of World War II, the average cost per case treated by fee-basis dentists has risen from about $70 to $101.57. Factors which have accounted for this rise are: (1) aging of the veteran population with its resultant increase in dental treatment requirements, (2) deferment by some veterans of required treatment which has resulted in the development of more serious dental conditions, and (3) changes in the cost of living over this period which has resulted in some upward adjustment of the fee-schedule rates. The cost of fee-basis examination cases has been more stable, rising only from about $13 at the end of World War II to $13.66 during the current fiscal year.

At the end of January 1953, the backlog of unprocessed applications exceeded 300,000 and $17,778,000 would have been required to bring this backlog down to normal proportions. The funds available for the remainder of the fiscal year are inadequate to keep the status quo; and at the end of this fiscal year the backlog is expected to exceed 400,000 applications. To achieve currency in operations by the end of this fiscal year would require not less than $24 million.

FUTURE OF THE PROGRAM

It is hard to visualize this program where the costs are measured in millions, the case loads in hundreds of thousands, and the units of treatment in individual teeth. Perhaps a more simple approach can be made by pointing out the practical effect of the enabling law in an individual case. Last summer the Veterans' Administration conducted a case study of veterans for whom outpatient dental treatment was provided. The study included 2,333 patients who had received treatment following a first application for such treatment and an additional 1,899 patients who were treated after a second or later application. The following facts were discovered.

Each new applicant on the average required treatment for more than half of his teeth

(only 14.6 of 32 teeth were found to be normal or functionally restored). For the repeat applicant, this situation was even slightly worse.

However, only about one-fourth of the average new applicant's teeth proved to be service-connected, and approximately 30 percent of the average repeat applicant's teeth were service-connected for treatment.

The basic law for outpatient treatment provides for the treatment of service-connected disability and also for other disabilities that may be associated with service-connected disability. Since the mouth is an integrally functioning organ of the human body and the teeth are all related, it is impossible to provide dental care solely for service-connected teeth in each case (although this is done where clinically possible). For example, if a veteran has lost his first molar under conditions which make that space service-connected and the two teeth adjacent to the molar are also missing but not service-connected, then to provide a replacement for the service-connected tooth, it is also essential to replace the two adjacent missing teeth.

It has been said that it is possible for a veteran patient to have only one service-connected tooth and finally to receive full dentures from the Veterans' Administration. It is possible by law and has occasionally, but not frequently, occurred.

The dental program has been made expensive by the fact that a large proportion of the veteran applicants require dental prostheses and also by the fact that once service connection is established, the Government provides continuing care at the Federal expense.

How involved and costly this continuing care is may be illustrated by a case of a veteran who has experienced seven episodes of treatment at VA expense. In 1935, this veteran who had 9 service-connected teeth came to the Veterans' Administration for treatment. He was authorized and received one filling at a cost of $3. Four years later in 1939, he returned for an upper partial which cost the Veterans' Administration $36.50. Three years later he received another upper partial at a cost of $48. Four years later in 1946, the Veterans' Administration remade the upper partial and constructed a lower partial at a cost of $85. In 1949, 3 years later, it was necessary to extract 7 teeth (only one of which was service-connected), construct an upper full denture, remake the lower partial and add one filling at a cost of $246. Two years later, it proved necessary to extract the veteran's remaining eight teeth (none of them service-connected) in order to give the veteran a full upper and lower at a cost of $164. One year later, he came in for additional treatment at a cost of $70. This veteran to date has not only cost the Federal Government $652.50, but he is also eligible for continuing treatment.

What then is to be done? The current program is admittedly expensive, but if the veteran is to receive effective dental care as presently authorized by law, there is no cheap way out. The cost per patient will increase as time goes on, and the only way that Congress can reduce the cost of the program without denying the veteran his legal due is to reduce the program's scope. The decision is up to Congress. Either Congress must provide generous funds for the outpatient dental program as it now stands, or, Congress must amend the program to the point where it is less generous to the veteran.

COUNCIL ON DENTAL RESEARCH

List of certified dental materials

Since the publication of the most recently revised List of Certified Dental Materials (revised to September 1, 1952) in the November 1952 issue of THE JOURNAL, the following material has been added.

CERTIFIED AMALGAM ALLOYS
(A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or distributor*
Oceanic Filling	Oceanic Chemical Co., Inc.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Survey of needs for dental care
III. Dental needs according to length of time since last visit to a dentist

The relationship between dental needs and the age of the patient was presented in detail in the preceding chapter.[1] Age is such an important factor in the dental needs picture, however, that it cannot be ignored in studies of the relationship between needs and variables other than age. To do so would be to invite spurious correlations; thus, a correlation between age and need for fillings might look like a correlation between length of time since last visit to a dentist and need for fillings, because of the relationship between age and length of time.

It has been necessary, however, to combine the five-year age groups into broader groups to provide an adequate number of patients for reliable averages and percentages (Tables 15 and 16). Certain combinations also have been made of the original length-of-time groups as set forth on the questionnaire. This and subsequent chapters will not include all types of need covered in the preceding chapter; a selection has been made of representative types of dental need.

In studying the variation of dental need according to length of time since last visit to a dentist, the "1 to 30 days" group should be considered a special category because it is logical to assume that practically everyone in that group was in a series of two or more visits when the survey was made. Doubtless some of the patients in the "31 days to 5 months" group likewise were in a series of treatments when included in the survey. For all other length-of-time groups the visit made to the dentist on the day of the survey was either the first visit of a series or the only visit necessary at that time.

Although length of time since last visit to a dentist provides an interesting and significant basis for study of dental needs, it is not an accurate measure of regularity of attendance at the dentist. Of those patients who last saw the dentist six months previously, probably most had been obtaining dental treatment with the recommended frequency over a period of years. Among this group, however, it is safe to say that there were some patients who had been negligent in earlier years.

To study in an ideal manner the relationship between attendance at the dentist and existing dental needs would have required obtaining a complete history of the patient's visits to dentists. Since this was not practical, length of time since last visit was used as an index.

Table 17 indicates a definite relationship between the patient's income and the amount of time elapsing since last visit to the dentist. Income is highest in the "31 days to 5 months" and "6 to 11 months" groups. These are the groups that apparently contain the highest percentage of patients who see their dentist with recommended frequency.

As indicated in Table 18, the average female patient had seen her dentist at a more recent date than the average male. Tables 15 and 16 and Figure 6 show the

1. Dental needs according to age and sex of patients. J.A.D.A. 46:200 Feb. 1953. The first article in this series was "Methodology and Composition of Sample," published in the December 1952 issue of The Journal, p. 706.

Table 15 • Dental needs of 15,672 white males, by length of time since last visit to dentist and by age

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
Teeth needing fillings																
—14	74.7	3.17	73.4	2.54	73.0	2.67	86.0	4.22	86.6	5.38	91.9	6.02	81.9	4.65	78.1	3.61
15—29	79.6	4.23	72.0	3.30	72.2	3.22	80.1	4.69	89.4	6.00	84.7	6.23	83.9	7.15	79.8	4.62
30—49	59.2	2.29	53.9	1.46	60.4	1.72	65.2	2.54	76.2	3.67	62.6	3.18	*	*	62.5	2.46
50—	33.6	.86	33.8	.61	48.4	1.20	41.4	1.26	40.7	1.30	26.4	1.05	14.1	.19	36.6	1.01
Total	64.3	2.79	57.3	1.90	63.9	2.22	69.0	3.20	76.1	4.25	61.0	3.62	73.6	4.46	65.4	3.00
Age 15 and over	60.9	2.67	52.6	1.71	61.3	2.09	64.6	2.94	74.4	4.06	59.2	3.48	52.9	3.68	62.0	2.83
One-surface fillings																
—14	60.0	2.08	56.6	1.64	57.4	1.8[illegible]	71.3	2.82	78.7	3.64	85.1	3.99	64.3	2.60	63.3	2.33
15—29	61.9	2.43	57.7	1.71	55.9	1.6[illegible]	66.1	2.45	74.6	3.28	74.8	3.53	71.2	3.78	64.6	2.52
30—49	41.2	1.25	33.7	.78	39.0	.91	45.8	1.27	59.2	1.92	48.6	1.71	*	*	44.1	1.31
50—	22.6	.56	20.6	.38	32.5	.77	26.0	.69	26.2	.67	14.9	.48	5.9	.07	23.4	.58
Total	48.1	1.65	40.6	1.07	46.0	1.29	52.5	1.77	61.3	2.37	48.7	1.99	57.0	2.41	49.3	1.69
Age 15 and over	44.3	1.51	36.0	.90	42.7	1.13	47.7	1.51	58.3	2.16	46.8	1.88	38.5	1.93	45.7	1.52
More-than-one-surface fillings																
—14	49.1	1.46	41.9	1.01	41.0	1.08	54.8	1.57	59.9	2.31	68.2	2.40	55.4	2.24	49.6	1.54
15—29	60.8	2.16	50.9	1.59	53.8	1.66	62.2	2.40	74.8	3.13	71.1	3.15	60.3	3.37	62.2	2.35
30—49	42.3	1.13	46.8	1.01	39.9	.83	48.6	1.31	61.6	1.94	47.8	1.53	*	*	45.3	1.23
50—	18.4	.32	16.0	.23	25.1	.43	24.0	.52	28.3	.65	19.2	.57	7.4	.12	21.0	.43
Total	44.8	1.35	38.3	.93	40.8	1.01	48.8	1.49	59.9	2.14	47.6	1.75	49.9	2.10	45.8	1.42
Age 15 and over	43.5	1.31	37.1	.91	40.8	.99	47.2	1.48	59.9	2.11	46.5	1.72	35.9	1.75	44.9	1.40
Extractions because of decay																
—14	59.6	.40	19.6	.41	14.5	.30	27.0	.64	37.3	.99	43.4	1.08	34.5	1.06	23.0	.59
15—29	19.9	.55	19.1	.54	16.7	.44	27.2	.79	32.3	.77	49.3	1.80	54.0	1.24	26.8	.81
30—49	11.4	.33	10.4	.30	9.9	.27	19.6	.53	25.8	.66	38.5	1.63	*	*	18.7	.61
50—	8.8	.32	6.5	.23	9.8	.28	18.3	.66	23.4	.97	28.0	1.22	19.7	.92	14.9	.60
Total	14.6	.41	13.4	.36	12.6	.32	22.8	.64	29.1	.79	38.9	1.54	35.8	1.07	21.0	.66
Age 15 and over	13.9	.41	11.5	.34	12.0	.32	21.7	.64	27.6	.76	38.7	1.57	39.1	1.11	20.5	.68

*Fewer than 50 patients.

Note: "%" means the percentage of patients needing the specified dental service. "Avg." means the average need (in number of teeth except for those categories designated "One-surface fillings" and "More-than-one-surface fillings") among **all patients**, including those with no need. To obtain the average need among those patients needing a particular dental service, divide the average by the percentage and move the decimal point of the quotient two places to the right.

Table 15 • Dental needs of 15,672 white males by length of time since last visit to dentist and by age—Continued

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
Total extractions																
—14	21.3	.51	24.6	.56	19.9	.47	33.3	.88	42.8	1.21	48.5	1.42	39.1	1.37	28.2	.76
15—29	31.4	1.13	29.4	.90	24.2	.81	38.7	1.34	41.5	1.43	60.5	2.52	60.9	1.63	36.9	1.33
30—49	28.1	1.67	23.6	1.49	22.2	1.16	34.0	1.59	41.9	1.90	58.5	4.79	*	*	34.3	2.06
50—	30.8	2.15	21.2	1.28	24.6	1.37	40.4	2.43	53.2	3.98	59.5	5.69	42.9	4.82	37.3	2.81
Total	27.8	1.26	24.5	1.06	22.6	.92	36.2	1.47	43.7	1.90	58.7	4.10	43.3	1.78	34.1	1.66
Age 15 and over	29.9	1.59	24.4	1.27	23.4	1.11	36.9	1.70	43.8	2.11	59.3	4.42	53.8	3.24	35.9	2.00
Periodontal treatment																
—14	.7	.09	.0	.00	.3	.01	.5	.04	.7	.03	.0	.00	.2	.01	.4	.04
15—29	5.2	.77	4.2	.45	3.3	.48	5.2	.86	4.7	.74	12.6	2.38	6.0	1.33	5.5	.89
30—49	11.3	1.64	9.7	1.40	7.1	1.03	12.3	1.70	13.4	1.93	18.3	2.72	*	*	11.6	1.69
50—	14.6	1.53	9.0	.94	9.0	1.01	10.0	1.26	12.3	1.58	10.2	1.45	4.3	.79	10.9	1.28
Total	7.6	1.00	6.1	.77	5.0	.66	7.6	1.06	8.7	1.23	13.7	2.16	2.3	.47	7.5	1.03
Age 15 and over	9.8	1.30	8.0	1.00	6.3	.85	9.5	1.33	10.1	1.44	14.5	2.29	7.7	1.64	9.5	1.31
Complete dentures																
	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower	Lower	Upper	Upper and lower
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
—14	.0	.1	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.5	.0	.1	.1
15—29	.3	1.4	2.7	.0	2.6	1.8	.4	.5	.7	.2	1.8	1.4	.0	2.0	1.1	.2	2.5	3.8	.0	1.1	.0	.2	1.6	1.9
30—49	1.4	4.6	10.8	.2	2.6	11.5	.3	2.4	5.3	1.1	4.5	5.4	1.3	4.6	5.5	.9	7.2	17.7	*	*	*	.9	4.4	9.5
50—	4.5	8.5	22.4	4.1	5.7	14.5	1.8	6.3	7.9	3.7	6.5	17.5	4.2	9.0	25.1	2.4	9.3	44.7	4.2	4.2	42.3	3.4	7.5	22.5
Total	1.3	3.3	7.9	1.0	2.8	7.6	.5	2.1	3.5	1.5	3.2	5.4	1.2	3.9	6.5	1.0	6.1	19.8	.5	.7	5.6	1.0	3.3	8.0
Age 15 and over	1.7	4.3	10.4	1.4	3.6	9.8	.6	2.7	4.4	1.4	4.1	6.8	1.4	4.5	7.6	1.0	6.5	20.9	1.7	2.3	18.4	1.2	4.2	10.1

*Fewer than 50 patients.

Table 15 • Dental needs of 15,672 white males by length of time since last visit to dentist and by age—Continued

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
								Permanent teeth missing								
—14	11.1	.22	5.8	.13	5.3	.10	9.1	.19	11.9	.24	9.5	.20	—	—	7.8	.17
15—29	61.4	3.26	57.5	3.10	43.1	1.81	45.6	2.25	50.1	2.19	54.4	2.98	—	—	51.6	2.55
30—49	83.3	8.69	77.8	7.76	69.3	4.84	73.9	5.81	76.0	5.62	79.9	7.20	—	—	76.8	6.81
50—	96.7	16.40	93.6	14.50	89.8	10.87	90.8	13.35	94.4	13.75	97.8	17.50	—	—	93.4	14.62
Total	59.9	6.15	58.3	6.27	49.7	3.88	53.5	4.77	59.9	4.82	73.5	8.36	—	—	56.0	5.43
Age 15 and over	78.1	8.35	76.6	8.40	65.2	5.19	67.6	6.20	69.4	5.73	77.8	8.87	—	—	72.0	7.16
								Permanent teeth previously replaced								
—14	.2	—	.5	.01	.0	.00	.8	.02	.3	.01	3.2	.04	.0	.00	.5	.02
15—29	12.5	.47	13.6	.60	9.6	.36	8.1	.37	8.6	.41	7.0	.32	.0	.00	9.8	.40
30—49	30.6	2.69	36.2	2.94	30.3	1.62	25.0	1.67	25.0	1.52	20.4	1.75	.0	.00	27.5	2.03
50—	51.5	6.88	52.1	6.18	52.7	5.29	48.5	5.74	35.2	4.52	31.2	4.93	.0	.00	44.8	5.60
Total	20.7	2.01	25.3	2.35	20.9	1.48	18.5	1.60	17.1	1.34	18.4	2.05	.0	.00	19.1	1.70
Age 15 and over	28.3	2.75	34.0	3.16	28.3	2.00	24.1	2.09	20.5	1.61	19.4	2.18	.0	.00	25.3	2.27
								No dental needs other than prophylaxis								
—14	5.9		12.4		14.8		7.1		3.9		2.0		7.6		8.7	
15—29	4.2		9.4		14.1		7.9		3.7		2.9		1.1		6.8	
30—49	6.3		11.3		17.6		8.4		4.8		2.4		*		8.6	
50—	7.7		15.8		14.2		7.3		2.1		1.5		5.6		8.2	
Total	5.9		12.2		15.5		7.8		3.9		2.3		6.4		8.2	
Age 15 and over	5.9		12.2		15.7		8.0		3.9		2.3		3.4		7.9	

*Fewer than 50 patients.

Table 16 • Dental needs of 22,239 white females, by length of time since last visit to dentist and by age

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
								Teeth needing fillings								
—14	74.2	3.13	75.0	2.96	79.6	2.96	87.3	4.53	92.1	5.99	93.4	6.71	84.6	4.60	80.3	3.77
15—29	77.7	3.81	71.0	2.89	77.2	3.28	83.3	4.48	88.3	5.69	85.4	6.64	85.7	5.88	80.0	4.26
30—49	60.9	2.27	60.8	1.76	65.1	2.06	72.5	3.03	77.5	3.76	64.1	3.56	*	*	65.7	2.59
50—	37.1	1.05	44.9	.99	54.3	1.35	53.9	1.67	49.9	1.74	26.4	1.22	*	*	43.5	1.29
Total	65.4	2.77	62.8	2.11	69.1	2.43	75.5	3.52	79.1	4.41	62.6	4.05	79.7	4.52	68.7	3.07
Age 15 and over	63.5	2.69	60.1	1.93	67.1	2.33	73.4	3.34	77.4	4.21	60.4	3.86	67.7	4.32	66.5	2.94
								One-surface fillings								
—14	59.7	2.01	60.0	1.94	65.2	1.98	73.8	2.88	84.8	4.05	85.5	4.96	70.4	2.87	66.7	2.49
15—29	61.9	2.22	52.8	1.64	59.7	1.82	66.8	2.50	77.5	3.32	74.4	3.71	81.8	4.25	64.8	2.44
30—49	44.9	1.37	42.9	1.01	47.8	1.23	55.1	1.77	63.3	2.12	51.9	1.96	*	*	49.5	1.49
50—	27.3	.68	30.0	.64	39.1	.86	35.4	.98	38.6	1.09	19.5	.78	*	*	30.8	.80
Total	50.5	1.66	45.8	1.26	52.5	1.45	58.8	2.05	67.1	2.61	51.8	2.33	67.5	2.86	53.7	1.82
Age 15 and over	48.5	1.58	42.8	1.11	50.1	1.35	56.0	1.90	64.9	2.43	49.4	2.14	60.7	2.86	51.3	1.69
								More-than-one-surface fillings								
—14	47.2	1.47	44.3	1.22	43.9	1.11	56.9	2.08	64.2	2.54	66.7	2.45	52.7	1.99	49.9	1.61
15—29	59.8	1.95	48.7	1.46	53.2	1.65	62.8	2.18	71.8	2.87	71.7	3.49	60.7	2.27	60.4	2.13
30—49	40.1	1.06	36.5	.83	41.4	.88	49.7	1.36	59.2	1.73	48.7	1.65	*	*	44.4	1.18
50—	20.1	.37	21.7	.35	26.3	.50	32.1	.71	29.6	.71	16.0	.46	*	*	23.3	.49
Total	44.9	1.33	38.0	.96	42.7	1.07	52.4	1.63	59.9	2.08	48.4	1.93	49.3	1.87	46.4	1.42
Age 15 and over	44.4	1.29	36.6	.91	42.4	1.06	51.6	1.55	59.4	2.02	47.0	1.89	41.9	1.62	45.9	1.39
								Extractions because of decay								
—14	15.3	.34	14.3	.35	13.7	.28	24.1	.55	35.4	.89	53.7	1.38	34.5	1.06	21.3	.55
15—29	18.1	.50	18.7	.44	14.8	.33	24.4	.65	32.7	.90	48.5	1.89	53.1	1.66	23.7	.70
30—49	13.3	.46	10.3	.26	8.6	.25	19.2	.52	25.5	.68	39.9	1.73	*	*	17.4	.59
50—	8.7	.26	5.6	.13	8.5	.18	12.8	.27	21.1	.74	24.3	1.12	*	*	12.5	.44
Total	14.6	.42	12.3	.30	11.2	.27	20.7	.53	28.5	.79	39.3	1.60	37.7	1.23	19.2	.60
Age 15 and over	14.5	.44	11.8	.29	10.7	.26	20.1	.53	27.7	.78	38.3	1.61	45.6	1.64	18.8	.61

*Fewer than 50 patients.

Note: "%" means the percentage of patients needing the specified dental service. "Avg." means the average need (in number of teeth except for those categories designated "One-surface fillings" and "More-than-one-surface fillings") among all patients, including those with no need. To obtain the average need among those patients needing a particular dental service, divide the average by the percentage and move the decimal point of the quotient two places to the right.

Table 16 • Dental needs of 22,239 white females, by length of time since last visit to dentist and by age—Continued

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
Total extractions																
—14	20.7	.51	21.7	.49	19.8	.46	31.6	.76	40.7	1.01	58.8	1.62	36.7	1.15	26.8	.69
15—29	28.7	1.03	28.5	.91	24.5	.67	34.1	1.08	44.5	1.54	58.1	2.95	64.3	2.20	34.1	1.21
30—49	25.7	1.46	22.0	.93	18.3	.76	33.4	1.42	38.6	1.86	53.9	4.51	*	*	30.2	1.65
50—	24.5	1.63	19.5	1.06	21.4	.96	35.0	2.15	42.0	2.81	47.2	4.19	*	*	29.9	2.00
Total	25.6	1.17	23.1	.88	20.8	.72	33.6	1.33	41.4	1.79	55.7	3.80	43.0	1.69	30.7	1.41
Age 15 and over	26.8	1.31	23.5	.95	21.0	.76	33.9	1.41	41.5	1.88	55.5	3.94	53.2	2.95	31.6	1.55
Periodontal treatment																
—14	.1	—	.4	.06	.1	—	.2	—	1.0	.24	.0	.00	.3	.01	.2	.03
15—29	5.1	.82	7.9	1.24	5.1	.72	6.2	.95	8.0	1.35	10.2	1.54	22.3	4.70	6.6	1.06
30—49	12.3	1.76	10.5	1.44	9.0	1.14	11.8	1.67	14.1	1.95	17.5	2.23	*	*	11.8	1.61
50—	11.9	1.39	12.0	1.58	9.4	1.03	11.7	1.09	13.0	1.52	10.0	1.04	*	*	10.9	1.23
Total	7.6	1.07	8.3	1.17	6.5	.82	8.2	1.10	10.3	1.48	12.3	1.58	5.0	1.06	8.1	1.10
Age 15 and over	9.3	1.31	10.0	1.41	7.8	.98	9.7	1.30	11.5	1.64	13.3	1.70	17.1	3.74	9.7	1.32
Complete dentures																
	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %	Lower %	Upper %	Upper and lower %
—14	.0	.1	.0	.0	.2	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.7	.7	.0	.0	.5	.0	.1	.1
15—29	.3	2.3	2.1	.1	2.2	2.5	.1	1.1	.5	.1	1.1	1.3	.0	3.2	1.8	.0	4.1	4.1	.0	2.0	3.1	.1	2.1	1.8
30—49	1.7	5.6	7.6	1.1	3.6	5.8	.5	2.0	2.2	1.0	3.7	3.9	.9	4.7	6.0	2.1	10.6	15.0	*	*	*	1.2	4.7	6.4
50—	5.6	6.2	19.3	3.7	4.3	10.8	2.3	3.5	5.4	3.1	7.6	13.5	3.9	8.3	16.8	5.2	13.9	38.0	*	*	*	4.1	7.1	17.0
Total	1.5	3.6	6.1	1.2	2.8	4.9	.6	1.7	1.9	.9	2.9	3.9	.9	4.1	5.3	2.1	8.9	16.7	.2	1.3	3.5	1.1	3.5	5.7
Age 15 and over	1.8	4.3	7.4	1.5	3.3	6.0	.7	2.0	2.2	1.0	3.4	4.6	1.0	4.7	6.0	2.3	9.5	17.9	.6	4.4	10.8	1.4	4.2	6.8

*Fewer than 50 patients.

Table 16 • Dental needs of 22,239 white females, by length of time since last visit to dentist and by age—Continued

Age	1 to 30 days		31 days to 5 mos.		6 to 11 mos.		1 year		1½ to 2 yrs.		3 yrs. or more		Never		Total	
	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.	%	Avg.
Permanent teeth missing																
—14	12.2	.27	12.4	.28	7.3	.13	8.5	.16	12.3	.24	14.6	.22	—	—	9.5	.20
15—29	59.4	2.55	50.8	2.39	42.4	1.52	45.8	1.71	49.2	1.88	55.1	2.23	—	—	50.2	2.04
30—49	80.0	6.59	74.0	5.70	65.0	3.67	68.2	4.56	73.0	5.16	80.6	6.94	—	—	73.1	5.42
50—	87.0	13.06	80.7	10.13	78.2	8.10	79.0	10.15	85.1	11.29	88.8	15.11	—	—	83.4	11.54
Total	60.2	4.87	56.3	4.50	48.9	2.97	51.5	3.59	57.7	4.13	70.3	7.12	—	—	55.0	4.27
Age 15 and over	72.4	6.00	67.7	5.56	58.9	3.63	60.9	4.31	64.4	4.67	75.0	7.67	—	—	66.0	5.23
Permanent teeth previously replaced																
—14	.3	.03	1.1	.04	.3	.01	1.2	.08	.3	—	.0	.00	.0	.00	.6	.02
15—29	13.3	.60	14.4	.64	10.9	.54	10.5	.43	9.3	.38	7.9	.41	.0	.00	11.2	.51
30—49	35.9	2.59	35.2	2.29	31.1	1.66	30.2	1.97	25.3	1.69	23.3	1.98	.0	.00	30.9	2.07
50—	53.2	6.97	56.1	6.12	55.3	5.54	50.5	5.62	46.4	6.17	40.8	6.34	.0	.00	50.2	6.15
Total	23.4	1.99	26.3	2.06	22.6	1.55	21.3	1.62	18.8	1.56	21.2	2.43	.0	.00	21.8	1.79
Age 15 and over	29.2	2.49	32.8	2.58	27.8	1.91	25.6	1.95	21.6	1.80	23.0	2.64	.0	.00	26.8	2.20
No dental needs other than prophylaxis																
—14	5.6		10.0		12.6		6.1		4.3		2.9		7.3		7.8	
15—29	4.9		10.5		12.2		6.5		3.7		2.3		3.1		6.9	
30—49	6.9		11.8		16.2		7.4		3.5		2.4		*		8.8	
50—	7.5		13.2		16.6		6.9		5.4		2.8		*		9.3	
Total	6.1		11.4		14.6		6.8		3.9		2.5		6.8		8.2	
Age 15 and over	6.2		11.7		15.0		6.9		3.9		2.5		5.7		8.2	

*Fewer than 50 patients.

average number of teeth needing fillings according to length of time and sex. Within length-of-time groups, females consistently had a greater number of teeth needing fillings. This suggests the possibility that females have a higher incidence of dental decay than males. Another possible explanation of this difference is that males are more inclined to neglect their teeth until extraction is necessary. This is borne out by the statistics on extractions required and on permanent teeth missing.

With respect to more-than-one-surface fillings, males and females were about equal. Females generally had a greater need for one-surface fillings.

It will be noted that among children 14 years of age and under, the number of fillings required was substantially lower for those who had never seen the dentist than for those who had seen the dentist more than a year before. This is explained by the fact that this age group

Table 17 • Median income of dental patients according to length of time since last visit to a dentist

Length of time	Males	Females
1—14 days	$4,554	$4,226
15—30 days	4,661	4,246
31 days—5 months	4,833	4,439
6—11 months	4,826	4,455
1 year	4,325	4,013
1½ years	4,474	3,994
2 years	4,174	3,864
3 years	4,038	3,755
4 years	4,060	3,667
More than 4 years	3,874	3,482
Never been to a dentist before	3,907	3,798
All patients	4,457	4,139

Table 18 • Percentage distribution of patients according to length of time since last visit to a dentist, by age and sex

Length of time	Male (by age groups)										
	—4	5—9	10—14	15—19	20—29	30—39	40—49	50—59	60—69	70—	Total
1—14 days	24.6	17.9	20.8	20.7	19.1	17.7	18.1	17.1	17.1	15.1	18.6
15—30 days	6.8	8.7	11.3	9.4	6.7	5.8	6.1	6.7	5.9	5.9	7.3
31 days—5 months	10.0	12.8	10.4	8.7	8.9	8.8	12.2	14.8	12.5	13.0	10.8
6—11 months	13.6	22.2	20.5	19.1	19.1	20.4	20.6	20.7	17.2	18.8	20.0
1 year	3.2	12.3	14.3	12.7	13.5	14.2	13.3	13.0	12.0	13.3	13.2
1½ years	1.4	3.9	3.8	6.0	6.5	5.9	4.5	4.1	2.4	1.8	4.8
2 years	.4	3.8	8.5	10.1	10.6	11.3	10.1	9.0	9.1	5.9	9.2
3 years	.0	1.0	2.7	4.1	5.9	5.3	5.5	4.1	5.0	4.0	4.3
4 years	.0	.2	.8	2.3	3.3	4.0	3.3	3.6	4.0	1.8	2.8
More than 4 years	.0	.4	1.5	3.3	5.0	6.3	6.0	6.6	9.7	13.3	5.0
Never been to dentist before	40.0	16.8	5.4	3.6	1.4	.3	.3	.3	5.1	7.1	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Female (by age groups)										
1—14 days	22.0	17.1	22.1	22.3	22.1	19.2	18.3	16.9	18.5	15.6	19.8
15—30 days	7.7	8.6	12.1	9.4	7.7	7.0	7.2	8.0	7.4	5.9	8.0
31 days—5 months	9.8	13.9	12.7	9.8	10.4	11.5	13.1	15.4	13.4	15.3	12.1
6—11 months	16.0	25.0	19.2	20.1	20.5	23.3	24.5	22.6	21.5	19.3	22.1
1 year	5.2	12.6	12.7	14.1	14.0	14.1	13.5	12.3	12.1	10.3	13.3
1½ years	1.7	3.2	3.9	5.3	5.4	5.1	4.1	3.8	3.1	4.5	4.5
2 years	1.0	4.0	6.9	8.9	9.7	9.9	7.6	7.9	7.3	4.5	8.3
3 years	.0	1.1	3.4	3.7	4.5	4.0	4.5	4.2	4.3	4.5	3.9
4 years	.0	.1	1.8	2.2	2.0	2.2	2.6	2.3	2.9	2.5	2.1
More than 4 years	.0	.3	1.3	1.6	2.6	3.4	4.3	6.4	8.9	10.6	3.4
Never been to dentist before	36.6	14.1	3.9	2.6	1.1	.3	.3	.2	.6	7.0	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

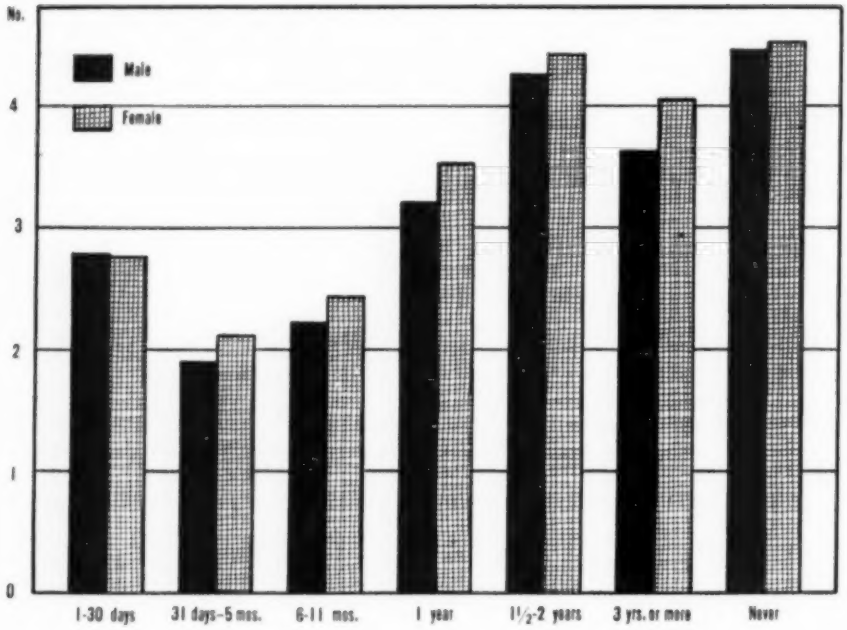


Fig. 6 • Average number of teeth needing fillings by length of time since last visit to a dentist and by sex

included the very young children who had not seen a dentist before not because of neglect but because of their age.

The need for extractions was about five times as great among patients who last saw their dentist over three years ago as it was among patients in the "6 to 11 months" group. At all age levels patients who had never seen a dentist before required fewer extractions than those who had seen a dentist more than three years before. For certain other dental needs, too, there was a lower average in the "Never" group. It is probable that this group was composed largely of persons relatively immune to dental caries.

The need for treatment for periodontal disease did not vary as much with length of time since last visit to a dentist as did other dental needs.

A larger percentage of the men than of the women required complete dentures in all length-of-time groups. Need for complete dentures varied markedly with length of time. The fact that several visits are required for the fitting of dentures is reflected in the relatively high percentage of patients in the "1 to 30 days" and "31 days to 5 months" groups requiring complete dentures. The low point is reached in the "6 to 11 months" group.

A very great increase in percentage of patients needing complete dentures occurred in the "3 years or more" group as compared with the "1½ to 2 years" group.

Those patients who had seen their dentist within the preceding five months averaged almost twice as many permanent

teeth missing as those who last saw their dentist between 6 and 11 months before. The probable explanation for this fact is the large representation in this group of patients in process of having dentures fitted. The number of permanent teeth previously replaced by dentures and bridges does not vary as much as most of the figures with length of time since last visit to a dentist.

The percentage of patients with no dental needs other than prophylaxis is highest in the "6 to 11 months" group, with the "31 days to 5 months" group a close second. This is what can be expected in view of the fact that the "1 to 30 days" group consisted almost entirely of patients in course of treatment and the "31 days to 5 months" group contained some patients of this type.

The patient who had not seen his dentist in over three years was in a rather deplorable dental condition. The average male in this category required 3.74 fillings and 4.10 extractions. He had 8.36 permanent teeth missing before the indicated extractions. A total of 26.9 per cent of this group needed at least one complete denture, and only 2.3 per cent needed no dental treatment other than prophylaxis.

By contrast, the average male in the "6 to 11 months" group needed only 2.30 fillings and .92 extractions. He had 3.88 permanent teeth missing before the indicated extractions. Only 6.1 per cent of this group needed one or two complete dentures, and 15.7 per cent had no dental needs other than prophylaxis.

B. Duane Moen, Director

COUNCIL ON DENTAL EDUCATION

Additional dental internship and residency programs approved

The Council on Dental Education and its Committee on Dental Internships and Residencies have reviewed the applications from a number of hospitals for approval of their educational programs. These hospitals have had their dental departments approved by the Council on Hospital Dental Service and the inspectors of that Council have inspected the educational program and facilities of these hospitals. These inspectors have reported on the manner in which the programs agree with the Requirements for the Approval of Hospital Dental Internship and Residency Programs developed by the Council on Dental Education and approved by the House of Delegates of the American Dental Association in October 1946.

The Council on Dental Education and its Committee on Dental Internships and Residencies voted at the meeting held in Chicago, February 5, 1953, to approve the educational programs in the hospitals listed in the accompanying table. The area or areas for which approval has been given, as well as the type of program, are also indicated.

Table • Hospitals and programs which have been approved

Hospital	Type of program	
	Internship	Residency
Herrick Memorial Hospital 2001 Dwight Way Berkeley 4, California Lyall O. Bishop, D.D.S. Chief of Dental Staff	Straight Oral surgery	
General Hospital of Fresno County 4461 Ventura Boulevard Fresno 16, California A. W. Pearson, Jr., D.D.S. Chief of Dental Staff	Straight Oral surgery	
Highland Almeda County Hospital 2701-14 Avenue Oakland 6, California James H. Hachtman, D.D.S. Chief of Dental Staff	Straight Oral surgery	Straight Oral surgery
*U. S. Naval Hospital Oakland 14, California Captain W. N. Van Zile, D.D.S., DC, USN Chief of Dental Staff		Straight Oral surgery
*U. S. Naval Hospital San Diego 34, California Captain Ralph W. Taylor, D.D.S., DC, USN Chief of Dental Staff		Straight Oral surgery
*U. S. Naval Hospital Naval Training Center Great Lakes, Illinois Captain G. D. Odiorne, D.D.S., DC, USN Chief of Dental Service		Straight Oral surgery
*Charity Hospital of Louisiana 1532 Tulane Avenue New Orleans 12, Louisiana Leopold L. Levy, D.D.S. Chief Independent Dental Unit; Frank J. Houghton, D.D.S. Chief Loyola University Dental Unit		Straight Oral surgery
Provident Hospital & Free Dispensary 1514 Division Street Baltimore 17, Maryland Bruce H. Alleyne, D.D.S. Chief of Dental Staff	Straight Oral surgery	
Massachusetts General Hospital Fruit Street Boston 14, Massachusetts David Weisberger, M.D., D.M.D. Chief of Dental Staff	Mixed Oral surgery Oral medicine	

*Internship approved previously.

Hospital	Type of program	
	Internship	Residency
Massachusetts Memorial Hospitals 750 Harrison Avenue Boston 18, Massachusetts Harold A. Carnes, D.M.D. Chief of Dental Service	Straight Oral surgery	
Percy Jones Army Hospital Battle Creek, Michigan Colonel George T. Perkins, D.D.S., DC Chief of Dental Service	Rotating Examination X-Ray & diagnosis Periodontia—Basic science Oral surgery Operative dentistry Prosthodontia	
Henry Ford Hospital 2799 West Grand Boulevard Detroit 2, Michigan Fred A. Henny, D.D.S., Chief Division of Oral Surgery		Straight Oral surgery
University of Minnesota Hospitals 412 Delaware S.E. Minneapolis 14, Minnesota Henry B. Clark, Jr., M.D., D.D.S., Chief Hospital Dental Service	Straight Oral surgery Mixed Oral surgery Diagnosis Radiodontia Pedodontia	Straight Oral surgery
Mountainside Hospital Bay and Highland Avenue Montclair, New Jersey Albert Hopper, D.D.S., President Dental Staff	Mixed Oral surgery Restorative dentistry	
Greenpoint Hospital Kingsland & Skillman Avenues Brooklyn 6, New York Emanuel Blumenthal, D.D.S., Director Department of Dentistry	Straight Oral surgery	
Jewish Hospital of Brooklyn 555 Prospect Place Brooklyn 16, New York Harry E. Jerrold, D.D.S., Moderator Dental Department	Mixed Oral surgery Exodontia Radiology Prophylaxis Orthodontics	
Veterans Administration Hospital 3495 Bailey Avenue Buffalo 15, New York Russell W. Groh, D.D.S. Chief of Dental Department	Rotating Oral diagnosis Restorative dentistry Prosthetic dentistry Exodontia Minor oral surgery Periodontia Radiology Anesthesia Endodontia	Straight Oral surgery

Hospital	Type of program	
	Internship	Residency
New York City Hospital Welfare Island New York, New York Pincus Sherman, M.D., D.D.S. Director of Oral Surgery	Straight Oral surgery	Straight Oral surgery
Roosevelt Hospital 428 West 59 Street New York 19, New York Clarence A. Dunn, D.D.S. Chief of Dental Staff	Straight Oral surgery	
Sydenham Hospital 565 Manhattan Avenue New York 27, New York Leo Tanzer, D.D.S. Director of Dentistry	Rotating Operative dentistry Oral surgery Anesthesia Orthodontia Periodontia Prosthodontia Endodontia Children's dentistry	
*U. S. Naval Hospital St. Albans 25, New York Captain Charles F. Hoyt, D.D.S., DC Chief of Dental Service		Straight Oral surgery
Cambridge State Hospital Cambridge, Ohio John B. Bennett, D.D.S. Chief of Dental Staff	Rotating Oral surgery Prosthodontia General anesthesia Periodontia Restorative dentistry Roentgenology	
St. Luke's Hospital 11311 Shaker Boulevard Cleveland 4, Ohio Cecil P. Titus, D.D.S. Chief of Dental Staff	Mixed Oral surgery Children's dentistry Anesthesia Oral pathology Prosthodontia	
St. Joseph's Hospital 16 Street and Girard Avenue Philadelphia 30, Pennsylvania John P. Looby, D.D.S. Chief of Dental Department	Mixed Oral pathology Periodontia Anesthesia	
Valley Forge Army Hospital Phoenixville, Pennsylvania Colonel H. Beecher Dierdorff, D.D.S., DC Chief of Dental Service	Rotating Oral surgery Prosthodontics Operative dentistry Crown and bridge Oral diagnosis—Examination Periodontia	

Hospital	Type of Program	
	Internship	Residency
Baroness Erlanger Hospital 241 Wiehl Street Chattanooga, Tennessee Ewing B. Connell, D.D.S. Chief, Oral Surgery Staff	Straight Oral surgery	
John Gaston City-County Hospital 860 Madison Avenue Memphis, Tennessee J. Roy Bourgoyne, D.D.S., Chief Division of Oral Surgery	Straight Oral surgery	
Medical College of Virginia Hospital Division 1200 East Broad Street Richmond 19, Virginia Atwood M. Wash, D.D.S. Chief of Dental Service	Straight Oral surgery	
Madigan Army Hospital Tacoma, Washington Colonel Ellsworth K. Kelly, D.D.S., DC Chief, Dental Service	Rotating X-ray and diagnosis Operative dentistry Oral surgery Periodontia Prosthetic dentistry	
Milwaukee Children's Hospital 721 North 17 Street Milwaukee 3, Wisconsin Francis J. Fleege, D.D.S. Chief of Dental Staff		Straight Pedodontics
Veterans Administration Center Wood, Wisconsin E. V. Millard, D.D.S. Chief of Dental Staff	Straight Oral surgery Straight Prosthodontics	

MAY 1953

LON W. MORREY, D.D.S., EDITOR
VOLUME 46 • NUMBER 5
Published by the American Dental Association
222 East Superior Street • Chicago 11, Illinois

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

Evidence favoring fluoridation continues to mount

Resolutions passed last month by two of dentistry's leading scientific agencies, decisions made by two of the country's larger cities and reports presented by two different groups of researchers strengthen the already sound position of proponents of water fluoridation. The Council on Dental Research, April 10, after a re-evaluation of evidence, reaffirmed its support of fluoridation as a dental health measure and commended departments of public health for their scientific contributions to the problem of caries control through fluoridation. The Council on Dental Health on April 14 restated its support of fluoridation as a safe anticariogenic measure, pointing out that the volume of accumulated scientific data has established beyond any reasonable doubt both its safety and efficiency. Milwaukee citizens on April 7 by referendum overwhelmingly approved fluoridation, and Cincinnati by an eight to one vote of its city council on April 1 decided similarly. Three researchers from the University of Rochester[1] reported on April 7 that "if all fluoride in drinking water containing one part per million fluorine were to be deposited in the skeleton, the situation would be perfectly safe." And lastly, a Yale University School of Medicine scientist[2] again scotched the rumor that fluoridation of water increases the incidence of cancer by reporting to the International Association for Dental Research, March 20, that tumors transplanted into mice developed more slowly if the mice received fluoride. Thus the scientific evidence mounts monthly in favor of fluoridation, leaving to opponents of the process only vapid arguments based either on emotionalism or misinformation.

1. Smith, Frank A.; Garner, Dwight E., and Hodge, Harold C. Age increase in fluoride content in human bone. Presented at Federation of Societies for Experimental Biology, Chicago, April 7, 1953.

2. Fleming, Harold S. Effect of fluorides on tumor S 37 after transplantation. Presented at International Association for Dental Research, March 20, 1953.

VA odontalgia—acutely swelling costs and Congressional headache

Rumors are rife in Washington that Congress proposes drastic curtailment of appropriations for the Veterans Administration's dental service program. Rumor also has it that even should Congress appropriate all the funds requested, the Bureau of the Budget, by executive action, will limit materially the amount to be spent for veterans' dental service. One of the reasons advanced by some Congressmen for the proposed reduction in appropriations is that medical and dental fees are too high.

No one conversant with the situation can deny that the cost of providing dental care to ex-service men has reached astronomical proportions and that future cost may be even higher. But anyone who looks facts in the face will question seriously the Congressmen's reasoning. The real cause of the mounting costs of VA dental service lies in the extravagant interpretation and administration of the overly liberal laws enacted by past legislators—not in any fancy fees of home-town dentists.

John E. Fauber, assistant chief medical director for Dental Service of the Veterans Administration, places squarely before Congress the present size and probable expansion of the program. He reports that during the past six and one-half years approximately three and one-half million dental examinations were made, and two and one-half million veterans were treated dentally by the Veterans Administration at a cost in excess of a quarter of a billion dollars. The full text of Dr. Fauber's report is published on page 558 of this issue. Despite this huge over-all figure, however, the cost of dental examinations from 1947 to date averaged but $13.33 per patient and dental treatment only $83.40 per patient. Even to the uninformed, these modest charges by dentists make the Congressmen's charges sound slightly sophomoric.

Last year Congress cut more than four million dollars from the amount requested for both medical and dental outpatient care, justifying the action by stating: "Congress is impressed with the fact that medical and dental fees are too high. . . ." This attitude, which still prevails in some quarters on Capitol Hill, indicates that although Congress is aware of the rising costs of the VA dental program, it is still unaware of the reasons for it or prefers not to look in the mirror.

The remedy suggested by the Appropriations Committee of the House of Representatives in 1952 for this national odontalgia is shortsighted and unrealistic, and the explanation given for the condition is dishonest. The Committee took no testimony regarding dental fees paid by the Veterans Administration or the methods by which such fees are determined. It did not consult with the American Dental Association in an effort to ascertain facts pertaining to fees, charges or total costs. It ignored completely the fact that the high costs of veterans' health service stems from the growing number of veterans who are availing themselves of the benefits provided by laws enacted by an overly liberal-minded Congress.

Present legislation authorizes dental care by the VA for a veteran whose dental disorder is service-connected or service-aggravated. Since ninety-five per cent of veterans, like all other Americans, have some dental disorder, and since veterans laws are so liberally interpreted that most doubtful points are resolved in favor of the ex-service man, most veterans who apply receive as much dental service as they desire for as many years as they desire it at the expense of society.

The fault in the Veterans Administration dental program was recognized and

pointed out by the American Dental Association at the annual session last September. The House of Delegates declared: "The present outpatient program of the Veterans Administration departs widely from the original concept of governmental responsibility for the treatment of service-connected disease, and . . . the present program, on the basis of existing law and regulations, promises an unrealistic amount of dental health care . . ." At a conference sponsored by the American Legion, March 1, Rudolph Friedrich, chairman of the Council on Federal Dental Services of the American Dental Association, spoke pointedly on the failure of both the Veterans Administration and Congress to recognize that the ambitious outpatient dental care program could result in life-long federally subsidized dental care for the majority of the ever-increasing veteran population. While stressing the fact that the Association does not oppose the provision of dental care for service-connected dental conditions and defects, he emphasized that the present Veterans Administration's determination of what constitutes a service-connected dental condition is completely unreasonable and, if retained, will require the continued expenditure of hundreds of millions of dollars of federal funds.

The real cause of the high cost of dental service provided by the Veterans Administration lies in the lap of Congress. If Congress really wishes to reduce the cost of this program to the nation it should reconsider the basic laws which it has enacted and, on the basis of sound professional opinion, reframe those laws realistically so as to protect both the rights of the veteran and the legitimate interest of the taxpayer. The facilities of the American Dental Association are at the disposal of Congress for whatever assistance it may need in a realistic evaluation of the problem.

Dental science: the stepchild of research finance

Two recent reports from federal agencies reflect to a degree the inadequate status of dental research, especially its financial inadequacy.

A survey report[1] of the National Institutes of Health sets forth the appropriations to various fields of health research from 1945 to 1953. Dentistry, to which funds have been granted since 1950, not only has received much less than any of the other fields including cancer, mental health, heart, arthritis and metabolic disturbances, neural disease and blindness, and microbiology, but it has had less relative increase in annual appropriations. Of the $20,468,000 granted in 1953 for all health research, dentistry has been awarded $221,000, or about 1.1 per cent. From 1950 to 1953, the increase allotted to dental research was $21,000, or 10.5 per cent. During the same period, the increase for cancer research was 89 per cent; for mental health, 109.3 per cent; for heart research, 34.8 per cent.

The second volume of the report by the President's Commission on the Health Needs of the Nation,[2] just published, tells a similar story. It indicates that "expenditures for dental research in 1949 amounted to less than one per cent of the total spent in the medical and biological fields." Tables in the report[3] indicate that the percentage is approximately 0.81; and among the 23 fields into which medical research is analyzed, the dental category is nineteenth in order of funds expended on

research. The dental schools of the country in 1949-1950 spent $733,000 for research, or approximately 3.1 per cent as much as the $23,600,000 expended by medical schools for a similar purpose. It is also pointed out[2] that the school expenditure for dental research was less than 0.1 per cent of the amount spent for dental treatment in dental offices throughout the nation.

The report of the Commission declares:

> The challenge of the times is to advance understanding of the fundamental causes of dental disease in its various manifestations. The results of research can point the way to new and better ways of treating disease through simplification of therapy, shortening of chair time, and improvements in dental materials.
>
> The disciplined search for new knowledge is an expensive undertaking. Its requirements for skilled personnel, physical facilities, and operational support are costly and become more so as the complexity of research increases.
>
> In the light of its potential benefits, however, the current investment in dental research is completely inadequate. This is the essential reason that dental research has scarcely scratched the surface of the multiplicity of problems which stand in urgent need of investigation.

Dentistry does not begrudge medicine the huge grants and bequests it receives for research purposes as it does not underestimate the wide scope of the medical field and the immeasurable depth of some of its problems. Nevertheless, dentistry, knowing the seriousness of dental disease and the potentials of its neglect, cannot accept with equanimity the lack of interest displayed in this problem by philanthropists, foundations and government officials. Clearly, the record shows that the interest in dental research is not at all proportional to that shown in medical research, and the financial support of dental research is not at all commensurate with its importance.

The lack of dental research conceivably can be explained in only three possible ways or in a combination of them:

1. The field of dental science, it might be supposed, does not present enough problems or sufficiently extensive problems to absorb the efforts of more research workers.

2. The number of competent research workers in the field of dentistry, it might be claimed, is not sufficient at the present time to undertake more research than is now being carried on.

3. The problems of dentistry, however vital they may be, do not appeal to the persons who have funds to allocate or to contribute to research.

It is impossible to believe that dental problems in great numbers do not exist, and it is hard to believe that all available and competent research workers in the field of dentistry have all the funds necessary to carry on their investigations satisfactorily. If the persons in control of available funds are not convinced of these propositions, the first steps to be taken in establishing dentistry's need for more research funds should be to present a survey of its problems calling for solution through research and to establish, on objective and incontrovertible evidence, the adequacy of its research manpower in comparison with that of medical science. Undoubtedly, plans for the collection of this information are contemplated by the Council on Dental Research in the expanded program which this agency is developing. The evidence, once obtained, should stimulate a greater flow of funds, private and public, into the dental research laboratories to the ultimate benefit of society.

1. Endicott, Kenneth M., and Allen, Ernest M. Trends in Public Health Service research grants, 1946-1952. Division of Research Grants, National Institutes of Health, 1953.

2. America's health status, needs and resources. A report to the President by the President's Commission on the Health Needs of the Nation. Vol. 2. Washington, D. C., Government Printing Office, 1953.

3. Financing a health program for America. A report to the President by the President's Commission on the Health Needs of the Nation. Vol. 4. Washington, D. C., Government Printing Office, 1953.

Washington News Letter

Money is the root of most of the legislative issues now being considered in Washington that are of importance to dentistry. In other words, Congress is preoccupied chiefly with appropriations bills for running the government another year, and some of them involve the private practitioners far more than is apparent on the surface.

Both the White House and Congress are striving for economies. As a result, sharp reductions are anticipated for the Veterans Administration and the U. S. Public Health Service. These are the budgets which, along with those of the offices of military Surgeons General, have major dental relations. Some of the projects are as follows: in the Veterans Administration, the "home town" dental care program, dental residency training, furtherance of dental research, and clinical care activities of its own full-time staff members; in the U. S. Public Health Service, the operation of the National Institute of Dental Research, training grants to dental schools, promotion of fluoridation and general assistance to dental public health.

Further complicating the picture is the fact that both USPHS and VA are in the throes of administrative reorganization. The former is now a unit of the Department of Health, Education and Welfare, which on April 11 replaced the old Federal Security Agency. The VA Department of Medicine and Surgery is currently the target of criticism relating particularly to dental and medical care of hospitalized nonservice-connected cases, the upshot of which will almost certainly be a revision of policies governing eligibility for health services.

At this writing, the 1953-54 budget estimates for USPHS dental health activities were still a closely guarded secret. They had been made public when they were submitted to Congress last January by President Truman, but President Eisenhower subsequently ordered revision of these and all other figures on governmental expenses for the fiscal year beginning July 1, 1953. Nevertheless, it was learned on excellent authority that this particular item was not treated too harshly.

Mr. Truman had recommended that $2,700,000 be allocated for dental health. This includes maintenance of the National Institute of Dental Research, teaching and research grants, the fluoridation program and general assistance to the states. Although President Eisenhower, acting through the Bureau of the Budget, trimmed $900,000 from that figure, the approved sum is still $90,000 higher than the amount available during the present fiscal year. Of course, the responsibilities of the National Institute of Dental Research will be increased substantially with the opening, probably some time in July, of the government's large clinical center at Bethesda, Md.

As for the Veterans Administration, it is not expected that the amount designated for dental services will be made public before the middle of May. Agitation is increasing on Capitol Hill to tighten up on veterans' benefits. This undoubtedly will have a strong influence on the size of the VA appropriations bill that is finally approved.

Other than these appropriations matters, interest is focused mainly on the so-called "doctor draft" law—whether it will be extended by Congress and, if so, for how long and under what terms. The steady outflow of dentists and physicians as they complete their tours of obligated

service makes it a virtual certainty that Congress will not let the special draft law terminate on June 30.

The House Armed Services Committee was planning to conduct public hearings on the question late in April, and its companion committee in the Senate probably will hold its hearings some time in May.

Two related matters which the committees will consider at the same time are (1) continuation of the $100 extra monthly pay for military dental and medical officers, and (2) health services for dependents of Army, Navy and Air Force personnel. The extra pay is due to be cut off for dentists and physicians who begin their active duty after June 30, unless Congress grants an extension. The Department of Defense is planning to have an investigation of the problem of the care of dependents, to be conducted by a special advisory group composed entirely of nonprofessional civilians.

A bill introduced in the House on April 15 by Rep. William J. Green, Jr., (D., Pa.) has as its objective the encouragement of development and marketing of improved products for use in dentistry. This would be accomplished by giving manufacturers a measure of tax relief, with particular reference to excess profits tax provisions.

Reductions would be applicable where it could be demonstrated that the income was from the sale of new and improved products which had been developed by "intensive research work not subsidized in any manner by any government department or agency," provided such research was started prior to January 1, 1950.

Also, tax relief would be given if at least 75 per cent of the sales volume of the new product was attributable to purchases by the civilian dental profession. The Green bill has been referred to the House Ways and Means Committee.

John Fauber, assistant chief medical director for Dental Service of the Veterans Administration, has announced the full roster of consultants on professional aspects of VA dental services. They are as follows:

Boston: Irving R. Hardy, Boston; Percy T. Phillips and Edward V. Zegarelli, New York City, and Edward T. Butler, Buffalo.

Washington, D. C.: Robert P. Thomas, Louisville, Ky.; Edward C. Armbrecht, Wheeling, W. Va.; Totten S. Molson, Cleveland, and Ernest B. Nuttall, Baltimore.

Atlanta: Homer J. Harpole, Atlanta, Ga.; Ralph E. Griffin, Birmingham, Ala.; John G. Traver, Jr., Jacksonville, Fla., and Clyde E. Minges, Rocky Mount, N. C.

St. Louis: Thomas R. Moore, St. Louis; Hobart Proctor, Denver; Frank J. Houghton, New Orleans, and Harry B. McCarthy, Dallas.

St. Paul: Irvin T. Harris, Chicago; George S. Easton, Iowa City; Rudolph P. Gingrass, Milwaukee, and Charles H. Jamieson, Detroit.

San Francisco: Sanford M. Moose and Jack Werner, San Francisco; B. O. A. Thomas, Seattle, and John R. Abel, Beverly Hills, Calif.

Association Affairs

CONFERENCE TO STUDY DENTAL RESEARCH STANDARDS

Seven committees have been organized to participate in the Conference to Develop Uniform Standards and Procedures in Clinical Studies of Dental Caries, which will be held November 2-3 in the Central Office under the sponsorship of the Council on Dental Research, the Council on Dental Health and the Council on Dental Therapeutics.

Maynard K. Hine, chairman of the Council on Dental Research, will make the introductory statement of the Conference.

Four committees will work on aspects of "design of the research study." Their topics and chairmen are as follows:

Type of index of caries experience: Paul C. Kitchin of Columbus, Ohio, chairman
Standardization of dental examinations: Thomas J. Hill of Cleveland, chairman
Methods for the control of variables: F. A. Arnold, Jr., of Bethesda, Md., chairman
Use of laboratory tests in a clinical study: Finn Brudevold of Rochester, N. Y., chairman

The other three committees will study the following topics:

Conduct of the investigation: Philip Jay of Ann Arbor, Mich., chairman
Analysis of data and evaluation of the results: A. L. Russell of Bethesda, Md., chairman
Publication (presentation): Kenneth A. Easlick of Ann Arbor, Mich., chairman

EARLY APPLICATION URGED FOR CLEVELAND RESERVATIONS

Applications for hotel accommodations are now being accepted for the ninety-fourth annual session of the Association to be held in Cleveland September 28—October 1. The application blank, published on page A-67 of this issue of THE JOURNAL, should be filled out and mailed to the American Dental Association Housing Bureau, 511 Terminal Tower, Cleveland 13. As a heavy attendance is anticipated and good rooms are not too plentiful, early application for hotel accommodations is advised.

COUNCIL ON DENTAL RESEARCH CONFIRMS FLUORIDATION STAND

The Council on Dental Research at its meeting April 10 confirmed its support of fluoridation and commended the health departments of city, state and federal governments which have consistently supported the measure.

The resolution embodying these actions is as follows:

Whereas, it is the belief of the Council on Dental Research that the investigations leading to the development of the program of fluoridating public water supplies as an aid in the control of dental caries are scientifically sound, and

Whereas, millions of people have consumed drinking water incidentally containing one part per million or more of fluoride for generations without known deleterious effect, and

Whereas, continuous study by qualified investigators has emphasized the safety of the use of water containing fluoride at a concentration of approximately 1 part per million, be it therefore

Resolved, that the Council on Dental Research of the American Dental Association affirms its confidence in the validity of the scientific investigations of

Otto W. Brandhorst, president of the American Dental Association, becomes an Arkansas Traveler by official action of the Honorable Francis Cherry, governor of Arkansas. The award was made during Dr. Brandhorst's attendance at the Arkansas State Dental Association meeting April 5-8 at Little Rock, Ark. Left to right are William R. Alstadt, trustee, Twelfth District; Governor Francis Cherry; Dr. Brandhorst; and Paul Hardage, president, Arkansas State Dental Association.

the fluoridation of public water supplies, and be it further

Resolved, that the Council on Dental Research commends the municipal, state and national departments of public health for their scientific contributions to the problem of control of dental caries through fluoridation, and be it further

Resolved, that the Council on Dental Research confirms its support of fluoridation as a dental public health measure.

Members of the Council on Dental Research include Maynard K. Hine of Indianapolis, chairman; Henry M. Goldman of Boston; M. D. Huff of Atlanta, Ga.; Clemens V. Rault of Washington, D. C., and Lawrence E. Van Kirk of Pittsburgh.

RELIEF FUND CONTRIBUTIONS CONTINUE TO CLIMB

With 75 days remaining before the 1952 Relief Fund campaign closes, receipts as of April 17 totaled $102,268.54. During April three more constituent societies—Colorado, Louisiana and Mississippi—exceeded their quota bringing to 35 the number of constituent societies which have gone over the top. Other societies that have passed their quotas are: Alabama, Alaska, Arizona, Arkansas, California, Southern California, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kentucky, Michigan, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, South Dakota, Tennessee, Washington, West Virginia and Wyoming.

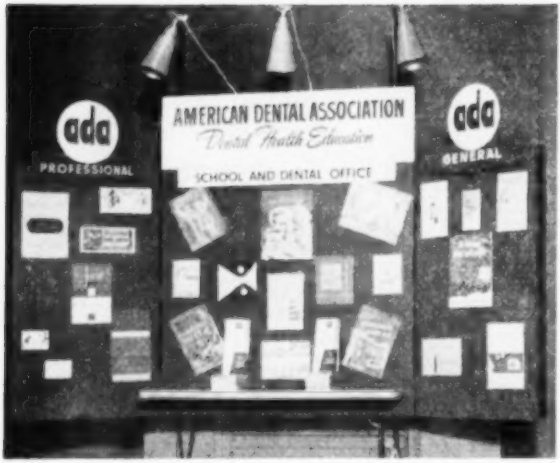
BUREAU TO STUDY ECONOMICS OF DENTAL PRACTICE

The administrative and economic aspects of dental practice—including operating hours, income, expenses, auxiliary personnel and type of practice—will be surveyed during May by the Bureau of Economic Research and Statistics, it has been announced by B. Duane Moen, director of the Bureau.

One of every three dentists in the United States will be sent a questionnaire on the administration of his practice; he will be asked to fill in certain information and to return the form immediately.

After the findings have been compiled, Mr. Moen states, it will be possible to show the relationship between dentists' income and such factors as age, number of years' experience, auxiliary personnel, number of dental chairs, size of city, region and type of practice.

The survey is similar to one conducted in 1950 by the Association, and will indicate recent trends in the profession. A



A new exhibit for displaying American Dental Association dental health education materials is available for circulation. The self-contained unit is 8 feet long, of lightweight construction (140 pounds, crated), and can be set up easily by one person. Dental societies and other professional groups, as well as civic organizations, can borrow the unit for showing at meetings, conventions and conferences. Although three units are available for circulation, it is suggested the organizations submit their requests as far in advance of their meetings as possible to facilitate booking for the dates desired. Requests should be sent to the A.D.A. Order Department, 222 E. Superior St., Chicago 11, for Exhibit No. 7 Dental Health Education Materials. Although there is no rental fee, the borrower is expected to pay the return transportation charges.

report on the findings will enable the individual dentist to compare the efficiency of his own practice with the standard set up as a result of the survey, observed Mr. Moen.

Dentists who receive the questionnaire are urged to cooperate fully in providing information promptly.

UNIONS REQUEST INFORMATION ON LOCAL DENTAL PROGRAMS

"Dentists will find in their local labor union council a pillar of strength if they will call upon it to support community dental health programs," declared Leslie A. Falk, area medical administrator in charge of the Pittsburgh office of the United Mine Workers of America Welfare and Retirement Fund.

Dr. Falk and other labor union representatives, who met with the Council on Dental Health April 13 to discuss dental health programs, agreed that public education regarding oral health and treatment is badly needed.

The mutual aims and problems of labor organizations and the dental profession in union-sponsored programs to provide dental service were outlined at the meeting.

Otto W. Brandhorst, president of the Association, presided. Unions represented included: American Federation of Labor: Lane Kirkland, assistant director, social insurance activities, and Herbert K.

Abrams, medical director of the health and welfare fund, Chicago Building Service Employees' Local No. 25; Congress of Industrial Organizations: Harry Reed, assistant to secretary-treasurer James B. Carey, and James Brindle, director of the social security department of the United Auto Workers-C.I.O.; International Association of Machinists: George Nelson, Grand Lodge representative, and William A. Sawyer, health consultant; United Mine Workers of America Welfare and Retirement Fund: Leslie A. Falk, area medical administrator in charge of the Pittsburgh office, and Phil Woods, dental consultant.

The meeting with the union officials was part of the April 12-14 meeting of the Council on Dental Health. In addition to members of the Council, participants representing the Association included president-elect Leslie M. Fitz-Gerald, first vice-president Henry F. Westhoff and trustee Obed H. Moen.

Dental Societies

HAWAII DENTAL SOCIETY ISSUES QUARTERLY NEWSLETTER

The first issue of *Aloha-dontia*, quarterly news letter of the Hawaii Territorial Dental Society, appeared in March. John H. Dawe, secretary of the Society, is chairman of the publications committee; Masue Taniguchi and A. M. Ito are committee members.

The annual meeting of the Society, to be held June 24-27 in Honolulu, will present as guest speakers Otto W. Brandhorst, president of the American Dental Association, and Harold Hillenbrand, Association secretary.

More than 1,000 free bitewing roentgenograms of child visitors were taken by volunteer members of the Akron Dental Society during the recent annual health exposition sponsored by the Women's Auxiliary of the Summit County Medical Society of Ohio.

Six members of the Dental Society and six members of the Society's Women's Auxiliary donated their services for either a morning or an afternoon during the three-day exposition. The dental booth, set up in a leading department store, included a dental chair and a roentgenographic unit donated by a local supplier.

After each bitewing roentgenogram was taken, it was placed in an envelope; and the patient was instructed to take it to his dentist for free developing and diagnosis, reports Milton N. Cooper, chairman of the Society's Council on Dental Health. The name of the patient, the date and a statement that the roentgenogram was given with the compliments of the Akron Dental Society were written on the envelope.

National Defense

ASSOCIATION TESTIFIES ON DRAFT EXTENSION LAW

In testimony April 22 before the House Armed Services committee on the extension of the "dentists-physicians draft act," Association representatives asked that the proposed law (H.R. 4495) be limited to two years and that the present $100 monthly equalization pay be continued.

J. Claude Earnest of Monroe, La., a member of the Council on Legislation, testifying before the House committee presented a series of suggested amendments to the Department of Defense bill which was submitted to the House April 13. He was accompanied by Rudolph Friedrich of Plainfield, N. J., chairman of the Council on Federal Dental Services: C. Willard Camalier, assistant secretary of the Association, and Francis J. Garvey, Bernard J. Conway and Howard N. Greenblatt, staff members.

In reply to previous testimony of the Army Surgeon General, who stated that the law must be continued "at least until 1956," Dr. Earnest said:

> Taking into consideration the number of dentists now in Priority III and the number of dentists who will be graduated in 1953, 1954 and 1955, the Association believes that it will be possible to supply during the next two years the necessary number of dentists for a 3,600,000 Armed Force without calling any of the veterans now in Priority IV.
>
> At the end of two years, it believes that the necessity of a special law to draft dentists will have ended, since by that time the dental schools will be graduating a sufficient number of new dentists, liable under the general draft law for services in the Armed Forces, to supply future needs for dental officers.

Dr. Earnest also spoke of the inequity of Public Law 779, which failed to give credit for active service rendered prior to entrance into ASTP or V-12 training. One of the Association's amendments would give credit for this service.

Another amendment suggested by the Association would establish criteria against which recommendations for deferment of dental school faculty members could be judged.

The fact that "hundreds of reserve dental officers are still serving in their World War II grades" was also noted by Dr. Earnest in his testimony. An amendment suggested by the Association would direct the Armed Services to adjust the ranks of Reserve officers recalled to active duty.

Dr. Earnest also restated the reasons why the Association believes the $100 monthly equalization pay should be continued.

STRAUSS COMMISSION ADVISES $100 PAY BE RESTRICTED

The report of the Strauss Commission, published March 28 by the Department of Defense, recommends that the $100 monthly equalization pay to medical and dental officers be restricted to "Regular officers and Reserve officers who volunteer and are accepted for duty beyond that required by Public Law 779 or subsequent similar legislation."

The Commission in effect has advised the discontinuance of the $100 monthly pay except to aid recruitment.

Representatives of the American Dental Association in testimony December 15 before the Commission recommended that the pay be continued on its present basis.

The Strauss Commission report states that the Commission is "critical of the payment of this extra pay to physicians and dentists whose education was materially financed by the Government while they also enjoyed deferment during World War II."

With few exceptions these men, Priority I and II registrants, have served or are now in uniform.

The Commission also contends that "as

a differential to compensate for loss of civilian earnings, this pay has questionable moral or logical justification unless it is also available to other citizens whose civilian incomes and subsequent careers are adversely affected by reason of military service."

The Association's testimony had stressed that many older dentists are being tapped for military service at an age when citizens in other fields are no longer liable for the draft.

These dentists, Dr. Friedrich stated, have assumed a variety of obligations in the expectation that they would continue in private practice. His testimony concluded that the $100 pay should be maintained to enable these men "to meet fixed obligations" and that to withdraw this payment while inducting men who most require it would jeopardize their financial survival.

The Strauss Commission was appointed last September at the request of the Senate Armed Services Committee. Chairman was Rear Admiral Lewis L. Strauss, USNR (Ret.); members were Harold G. Moulton, president emeritus of the Brookings Institution; John Thomas Cahill, lawyer of New York; Joseph Campbell, vice-president and treasurer of Columbia University, and Don C. Mitchell, chairman of the board of an electrical corporation.

NEW ASSISTANT CHIEF NAMED FOR ARMY DENTAL DIVISION

Col. George F. Jeffcott, D.C., USA, has been appointed assistant chief of the dental division in the Office of the Army Surgeon General to succeed Brig. Gen. Egbert W. Cowan, new director of dental activities at Walter Reed Army Medical Center.

An alumnus of the University of Oregon School of Dentistry, Colonel Jeffcott has previously served as a post dental surgeon in this country and overseas, as a historian of the dental corps and as chief

G. F. Jeffcott

of the dental standards branch since January 1952. The new chief of the dental standards branch is Col. Clare T. Budge, formerly of Fitzsimons Army Hospital.

MILITARY RELAXES PRESSURE ON PRIORITY III PHYSICIANS

Selective Service headquarters has instructed state directors of Selective Service to stop the processing and induction of Priority III physicians born before August 31, 1922. Many dentists, learning of these instructions, are of the opinion that Priority III physicians above the age of 31 are no longer subject to induction. This interpretation is wrong.

Easing of pressure on medical men in this group is attributable to the following factors: There are a number of young Priority III physicians who have been deferred until they can complete their internships or residency programs. Many of these young men will be available within the next 60 to 90 days. In addition, as a result of re-examination under the recently lowered standards for dentists and physicians, Selective Service has reclassified a number of physicians in Priorities I, II and III who previously had been rejected for physical reasons. Instructions to the state directors are to postpone induction of the group described only for the time being. In the meantime, ruling for dentists in Priority III remains unchanged up to and including age 40.

MEDICO-MILITARY SYMPOSIUM TO HEAR LESLIE FITZGERALD

Leslie M. FitzGerald of Dubuque, Iowa, president-elect of the Association, will speak at the Medico-Military Symposium of the Armed Forces of the United States, to be held May 6-8 at the U. S. Naval Hospital, Great Lakes, Ill.

The subject of Dr. FitzGerald's talk will be "Medical and Dental Specialties and Their Interdependence in Military and Civilian Training and Practice."

Participants in the meeting will include Rear Admiral D. W. Ryan, chief of the dental division, U. S. Navy; Maj. Gen. Walter D. Love, chief of the dental division, U. S. Army, and Brig. Gen. M. E. Kennebeck, chief of the dental division, U. S. Air Force.

MAY INDUCTION QUOTA OF 195 DENTISTS ANNOUNCED

A call for 195 dentists has been issued by the Department of Defense for the month of May. Inductees primarily will be Priority III registrants up to the age of 41, it has been announced by the Selective Service System.

A recent information bulletin to state Selective Service directors from the National Advisory Committee listed the pathological conditions that the Armed Forces will waive in order to classify a medical or dental officer "examined and acceptable."

The conditions include: tuberculosis, if the subject has been symptomless for two years; peptic ulcers if uncomplicated by frequent hemorrhaging; diabetes or epilepsy that is under control; absence of a kidney, and skin cancer without metastasis. The rate of 4-F classifications in Priority III has fallen to 16 per cent from 50 per cent in 1952.

DEFENSE DEPARTMENT RETAINS DENTAL ADVISER IN COUNCIL

Although the Department of Defense abolished its Armed Forces Medical Policy Council April 1, James P. Hollers of San Antonio, Texas, will continue to represent the dental profession in Pentagon conferences on military health matters.

Dr. Hollers has been appointed to the newly created Civilian Health and Medi-

Lt. Col. W. E. Meldrum (center), commandant of the Dental Corps School of the Royal Canadian Army, recently visited Washington, D. C., for a course at the National Naval Medical Center and conferences with Armed Forces Dental Corps officials.

Colonel Meldrum is shown with Capt. Ralph W. Taylor, DC, USN (left), commanding officer of the Naval Dental School; Russell W. Bunting (right), dental consultant to the health and special weapons defense division of the Civil Defense Administration, and Maj. Gen. Walter D. Love (left, inset), chief of the Dental Division, Office of the United States Army Surgeon General.

cal Advisory Council which replaces the former Council. Melvin A. Casberg, former chairman of the Armed Forces Medical Policy Council, has been appointed assistant to the Secretary of Defense with responsibility for all health and medical affairs within the Department. He will confer periodically with the new Council on policy matters.

Unlike the former Council, the new six-member group is exclusively civilian and includes no representation from the Army, Navy or Air Force.

Dental Education

WEST VIRGINIA DENTAL SCHOOL NAMES J. BEN ROBINSON DEAN

J. Ben Robinson, who retired April 30 as dean of the Baltimore College of Dental Surgery, University of Maryland, has been appointed dean of the newly-established School of Dentistry, West Virginia University, effective May 1.

A native of West Virginia, Dr. Robinson served for 29 years as dean of the Baltimore College of Dental Surgery, from which he was graduated in 1914. In his new office he will direct the organization of the curriculum, staff and physical plant of the new school in preparation for its opening in the fall of 1954. Students for the first class will be selected during the 1953-54 school year.

Dr. Robinson has held many offices in dental organizations and is well known as a dental historian, educator and author. He has served as president of the American Dental Association, Maryland State Dental Association, American Association of Dental Schools, American College of Dentists and the American Academy of the History of Dentistry. He was a member of the Council on Dental Education for many years and Supreme Grand Master of Omicron Kappa Upsilon during 1931-48.

FORMER MINNESOTA DEAN W. F. LASBY DEAD

William Frederick Lasby, dean of the University of Minnesota School of Dentistry from 1928 to 1945, died April 12 in Santa Ana, Calif., at the age of 77 years.

W. F. Lasby

During the administration of Dr. Lasby, a new building was erected for the Dental School, and graduate work leading to advanced degrees was added to the educational program in dentistry.

Dr. Lasby was a member of the American Dental Association, a Fellow of the American College of Dentists, and a member of many other dental organizations. He had served as president of the American Association of Dental Schools. Dr. Lasby was a member of Omicron Kappa Upsilon, honorary dental society, and he was a 32nd degree Mason. He was retired from the Army Reserve Dental Corps with the rank of Lt. Colonel.

DENTAL SCHOOLS ASSOCIATION ELECTS 1953-54 OFFICERS

Maynard K. Hine, dean of the Indiana University School of Dentistry, was installed as president of the American Association of Dental Schools at its annual meeting March 23-25 in Philadelphia.

Other officers elected at the meeting include John Buhler, dean of the School of Dentistry, Emory University, president-

elect; Harold J. Noyes, dean of the University of Oregon Dental School, vice-president; and Marion W. McCrea, professor of embryology and histology, Baltimore College of Dental Surgery, University of Maryland, secretary-treasurer.

The new member of the executive council of the A.A.D.S. is William Crawford, dean of the University of Minnesota School of Dentistry. Bert Hooper, dean of the University of Nebraska College of Dentistry, was nominated to represent the A.A.D.S. on the Council on Dental Education; George Easton, professor at the State University of Iowa College of Dentistry, was nominated as the organization's representative on the National Board of Dental Examiners.

NORTH CAROLINA DENTISTS GIVE DENTAL SCHOOL PLAQUE

At the dedication of the new North Carolina Memorial Hospital on the campus of the University of North Carolina, April 23, the dentists of North Carolina presented to the School of Dentistry a bronze plaque in memory of Henry O. Lineberger, one of the pioneers in the promotion and founding of the School.

The plaque was presented by Paul E. Jones of Farmville, N. C., a State Senator, member of the Board of Trustees of the University and president of the Dental Foundation. Lloyd Dodd of Decatur, Ill., presented an address on administration of dental practice.

DENTAL SCHOOLS ANNOUNCE POSTGRADUATE COURSES

Mexican National University • Two courses in endodontics will be presented by the dental division of the School of Graduates, Mexican National University, June 1-13 and June 29-July 4 respectively. Yury Kuttler will direct both courses, which are sponsored by the Dental School, the Mexican Society of Endodontics and the Mexican Dental Association.

Information on these courses may be obtained from the director of the Graduate School, Mexican National University, Querétaro 97, México 7, D. F.

Georgetown • A course in advanced procedures in crown and bridge will be presented June 1-5 (Monday through Friday) and advanced operative dentistry embracing airbrasive will be presented May 25-29 (Monday through Friday) by the Georgetown University School of Dentistry.

Roentgenographic technic for dental hygienists and dental assistants will be taught Monday, Tuesday and Wednesday evenings, April 27-May 27.

Further information and registration forms may be obtained from the registrar's office, Georgetown University School of Dentistry, Washington 7, D. C.

New York • A postgraduate course in practice management, stressing the development of good patient relationship, will be presented June 8-12 in afternoon and evening sessions by the New York University College of Dentistry.

Emphasis will be placed on consultation methods to relieve the patient's fears; education to create understanding of the need of treatment; and motivation to show the value and importance of dental care based on the patient's individual dental, medical and socioeconomic needs.

Applications may be made to the secretary of the postgraduate division, New York University College of Dentistry, 209 East 23rd Street, New York 10.

North Carolina • A 15-month graduate course in orthodontics, leading to a Master of Science degree, will begin in June 1953 under the direction of L. B. Higley, it has been announced by John C. Brauer, dean of the University of North Carolina School of Dentistry.

A four-day refresher course in pedo-

dontics, including clinical work with patients, will be offered June 15-18 under the direction of Dr. Brauer and W. W. Demeritt.

Application for the graduate or the refresher course may be made by writing to the dean, School of Dentistry, University of North Carolina, Chapel Hill, N. C.

Northwestern • The graduate department of orthodontics, Northwestern University Dental School, will present a postgraduate course June 15-17 on the practical application of cephalometric roentgenography to orthodontics and functional analysis of occlusion.

The course will cover the technic of cephalometric roentgenography, interpretation of cephalometric roentgenograms, evaluation of orthodontic therapy, influence of facial growth on orthodontic therapy, normal and abnormal function of the temporomandibular joints and functional analysis of the occlusion and articulation of the teeth.

Further information and application forms may be obtained from the dean, Northwestern University Dental School, 311 East Chicago Avenue, Chicago 11.

International

PANAMA DENTAL SOCIETY REORGANIZES, NAMES OFFICERS

The dental association of Panama, which was formerly known as the Asociación Dental de Panamá, has been reorganized under the name Asociación Odontológica Panameña.

The organization's officers for 1953 are: Ramon M. Valdés, president; Rubén Arcia, vice-president; Jaime Díaz G., recording and corresponding secretary; Augusto Díaz Q., press secretary; Eneas Quintero P., social and cultural secretary; Leonida Pinilla, treasurer, and Jorge E. Morales, technical advisor.

CANADIAN DENTAL ASSOCIATION TO MEET OCTOBER 18-21

The annual meeting of the Canadian Dental Association will be held in conjunction with the annual fall clinic of the Montreal Dental Club October 18-21 in Montreal.

Information on the meeting may be obtained by addressing D. B. Ward, 1414 Drummond Street, Montreal, Canada.

SWEDISH DENTISTS VISIT CENTRAL OFFICE

Henry L. Beyron, dentist to the king of Sweden and specialist in restorative dentistry, and Gosta Lindblom, Swedish specialist in bite analysis and prosthetics, visited the Central Office of the Association during their recent lecture tour of this country. Mr. Lindblom, who holds an L.D.S. degree, has been treasurer of the Scandinavian Dental Society since 1936, and is a member of the editorial staff of the Journal of the Swedish Dental

H. L. Beyron

G. Lindblom

Association. Both men practice in Stockholm, and both are special lecturers on the postgraduate program annually provided for members by the Swedish Dental Association.

GERMAN DENTAL SOCIETIES AMALGAMATE

Two of Germany's most important dental organizations were amalgamated on March 31. On that date the Verband der Deutschen Zahnhärztlichen Berufsvertretungen (Organization of the German Dental Auxiliary Personnel) and the Verband Deutscher Dentisten (Organization of German Dental Technicians) disbanded and merged their resources to form the Bundesverband der Deutschen Zahnärzte (Federation of German Dentists) which is now the official national dental organization in Germany and is affiliated with the Fédération Dentaire Internationale. The presidents of the new organization are: Erich Müller, Hamburg-Altona, bei der Johanniskirche 20, and August Siebecke, München 19, Donnersberger-Str. 5. The secretary is F. H. Witt, Köln-Sulz, Wilhelm-Waldeyer-Str. 16, P. O. Box 21 and 136.

F.D.I. MEETING TO DISCUSS AMERICAN FLUORIDE REPORT

A provisional program for the July 26-August 1 annual meeting of the Fédération Dentaire Internationale in Oslo has been issued by Olaf Grythe, chairman. Open meetings will be held from Monday morning, July 27, to Saturday afternoon, August 1, by the Fédération's scientific, armed forces, educational, oral health and external relations commissions, Dr. Grythe has announced.

A report on fluoridation in this country will be delivered by an essayist from the United States, it has been announced; representatives from Switzerland and France will open discussion of the report.

Oren A. Oliver of Nashville, Tenn., president of the F.D.I., has urged all member organizations to send representatives to the meeting. "At no time in the history of the dental profession has it been more essential for there to exist an active, well organized international body, representing world-wide dentistry," he stated in the February issue of the Fédération *News Letter*. "This we have in the Fédération Dentaire Internationale, providing the member associations give their full support."

Information on hotel accommodations and travel arrangements may be obtained from Knut Gard and Gudwin Sydnes, Den Norske Tannlaegeforening, 17 Incognitogatan, Oslo, Norway.

ARGENTINE DENTAL SOCIETIES ELECT OFFICERS

Three Argentine dental societies have announced their officers for 1953. The Asociación Odontológica Argentina elected the following Board of Directors: Ricerio V. Canzani, president; Antonio Calle Guevara, vice-president; Héctor A. Tarasido, secretary; Marcelo Friedenthal, assistant secretary; Hermenegildo M. Arnejo, treasurer; Samuel Pisarenko, assistant treasurer.

Círculo Odontológico Del Oeste elected Horacio R. Zavala president for the coming year. Other officers include Ricardo D. Carnevale, vice-president; M. Raul Volinier, secretary; Esteban C. Vallega, assistant secretary; Raul Farbman, treasurer and Gregorio Díaz, assistant treasurer.

The 1953 Board of Directors of the Sociedad Argentina de Ortodoncia was recently elected by the organization's General Assembly, as follows: Rául Otano Antier, president; Ramón Torres, vice-president; Elio A. De María, secretary; Alberto O. Del Intento, assistant secretary; Edmundo G. Locci, treasurer, and Eduardo B. Prieto, assistant treasurer.

Research

RECORD ATTENDANCE REPORTED AT I.A.D.R. MEETING

A record-breaking total of 573 members and guests attended the 1953 meeting of the International Association for Dental Research which was held March 20-22 in Philadelphia, it has been announced by Edward H. Hatton, secretary-treasurer.

Francis A. Arnold, Jr., of Bethesda, Md., was installed as president for 1953-54; Dr. Arnold is the new director of the National Institute of Dental Research.

George C. Paffenbarger of Washington, D. C., was elected president-elect, and Paul E. Boyle of Philadelphia was elected vice-president.

Edward H. Hatton of Chicago and Dan Y. Burrill of Louisville, Ky., were re-elected secretary-treasurer and assistant secretary-treasurer, respectively. The trustees and publication committee of the organization remain the same.

The next meeting of the International Association for Dental Research will be held at French Lick Springs, Ind., March 19-21, 1954.

DENTAL RESEARCH CHEMIST OF N.I.D.R. RETIRES

The senior chemist with the National Institute of Dental Research, Elias Elvove, retired March 31 after 46 years with the U. S. Public Health Service.

For many years Dr. Elvove was associated with H. Trendley Dean, recently retired director of the Institute, in developing a method for the determination of the fluoride content of waters accurate to 0.1 part per million. He also developed the method for removal of fluorides from water.

Dr. Elvove, who is 70 years old, holds doctorates in pharmacy and chemistry from George Washington University.

FILM PRIZE TO BE AWARDED BY ARPA INTERNATIONALE

An award will be made to the participant showing the best film on periodontal diseases at the thirteenth Congress of Arpa Internationale (Association for Research in Periodontal Disease). The Congress will be held July 14-19 in Geneva, Switzerland.

Dentists who wish to show films may register their titles before June 30 by writing to Prof. A. J. Held, Institut de Médecine Dentaire, Geneva. Official languages of the Congress will be French, English and German.

Information on the program and arrangements may be obtained by writing to J. N. Nally, 8, rue de Saussure, Geneva.

Public Health

HEALTH CENTER TO OFFER COURSE IN FLUORIDATION

Fluorides in water will be the subject of a short course to be conducted May 28-29 at the Environmental Health Center, Cincinnati, by the Center and the Division of Dental Public Health of the USPHS.

The course will cover public health aspects of fluoridation and technical information on the choice of compounds and equipment. Further information may be obtained from the specialized sanitation training section, Environmental Health Center, 1014 Broadway, Cincinnati 2.

MILWAUKEE, CINCINNATI VOTE TO FLUORIDATE

A referendum on fluoridation in Milwaukee has resulted in the voters' expression of support for the health measure, it has been announced. The City Council of Milwaukee had previously approved

fluoridation, and equipment for the process had been installed when the referendum was requested.

Cincinnati's City Council voted April 1 to fluoridate the city's water supply. The Council announced that the ordinance would go into effect April 30 unless opponents of the health measure could obtain 14,000 signatures opposing the action before the effective date.

Another of the major cities about to inaugurate fluoridation is Philadelphia, where health officials report that equipment has been installed in order that the process might begin in May.

General

DEATH OF JOHN V. MERSHON NOTED ORTHODONTIST

John V. Mershon, one of the nation's most distinguished orthodontists, died February 20, at the age of 87, in Philadelphia. He was best known for his development of a lingual arch appliance which has been extensively used in the correction of malocclusion.

Dr. Mershon was graduated as a dentist from Pennsylvania Dental College in 1899. After practicing dentistry for 19 years, he studied orthodontics at the Angle School of Orthodontia, and upon graduation entered the practice of orthodontics exclusively. He served as president of the American Society of Orthodontists and was the recipient of many honors and distinctions including the honorary degree of Doctor of Science from the University of Pennsylvania, the William Jarvie Fellowship Medal and the Albert H. Ketcham Memorial Award in orthodontics.

Dr. Mershon was one of the earliest orthodontists to approach problems of malocclusion from a biological viewpoint.

TEMPLE DENTAL SCHOOL ALUMNI TO HOLD REUNION MAY 13

The Alumni Association of Temple University School of Dentistry will honor James R. Cameron, professor of oral surgery at the School for the past 18 years, at a testimonial dinner on the evening of May 13.

The dinner, which will climax an all-day alumni reunion, will also be the occasion at which members of the Class of 1903 will be presented Golden Circle Certificates in observance of their fiftieth anniversary as dentists.

The alumni reunion will include morning and afternoon scientific sessions as well as a business meeting at which a new portrait of Gerald D. Timmons, dean, will be presented by the alumni organization to the School of Dentistry.

Leslie M. FitzGerald, president-elect of the American Dental Association, will be the featured essayist at the morning session and will speak on oral surgery. Ten table clinics will be presented during the afternoon session.

Further information on the testimonial dinner for Dr. Cameron and on the reunion program may be obtained by writing to Herman G. Nailor at Temple University School of Dentistry, Philadelphia 40.

DENTAL RESEARCH FUND NAMED FOR NEW YORK DENTIST

The members of the dental staff and friends of Montefiore Hospital, New York City, on April 10 announced the establishment of the David Tanchester Dental Research Fund, which has been organized "in recognition of the achievements of David Tanchester and his contributions to dentistry."

A dinner celebrating the establishment of the Fund will be held June 18 in New York City. Interested persons may communicate with E. Alan Lieban, 30 Central Park South, New York 19.

INTERNATIONAL ACADEMY OF ANESTHESIOLOGY TO MEET

A morning seminar on anesthesia and an afternoon session of operating room clinics will constitute the seminar of the International Academy of Anesthesiology May 13 in Washington, D.C.

The meeting will be held at the George Washington University Hospital. Charles S. Coakley, director of anesthesiology at the Hospital, will be the moderator of the morning session, and Karl H. Wood, director of oral surgery, will preside over the afternoon clinics.

Information on the open meeting may be obtained from Irwin G. Tomack, secretary, 355 East 149th Street, New York.

THEODOR BLUM WINS AWARD FROM SIGMA EPSILON DELTA

Theodor Blum of New York, founder of the New York Institute of Clinical Oral Pathology, will receive Sigma Epsilon Delta fraternity's annual award for outstanding contributions to dentistry.

The award will be presented to Dr. Blum at Sigma Epsilon Delta's annual convention May 22-24 at Totem Lodge, Averill Park, N. Y.

NEW YORK ACADEMY INSTALLS NEW OFFICERS

The New York Academy of Dentistry on April 9 installed Ralph J. Bowman as president for the coming year. Dr. Bowman succeeds Henry Hicks of Greenwich, Conn. Others who assumed office last month were Roland E. Morse, president-elect; Willard T. Keene, vice-president; William Ward Tracy, secretary; and Gustav P. Frahm, treasurer. The latter two continue from previous terms.

The New York Academy of Dentistry, organized in 1921, is composed of approximately 400 practitioners who through research, teaching, development of new dental procedures or technics, or in other ways, have distinguished themselves by contributing to the advancement of the profession and the dental welfare of the public.

Also . . . The new dean of New York University College of Dentistry, Raymond J. Nagle, was feted at a dinner of welcome by the Alumni Association of the College April 24 in the Starlight Roof of the Waldorf-Astoria Hotel, New York. . . . The new associate director of the Northwestern University Cleft Lip and Palate Institute is Walter W. Dalitsch, associate professor of oral surgery. The Institute has announced plans for expanding its present facilities to accommodate the increased number of patients and activities. . . . The Dentists' Supply Company recently consolidated its executive, sales, accounting, advertising, export, wholesale order and wholesale tooth departments in its central manufacturing plant in York, Pa. . . . The proceedings of the nomenclature conference sponsored by the Bureau of Library and Indexing Service last June are now available under the title, *Concepts Pertaining to Occlusion*. Single copies may be obtained by addressing the Library, 222 East Superior Street, Chicago 11. . . . A June call for 145 dentists has been issued by the Department of Defense.

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editors reserve the right to edit all communications to fit available space and require that all letters be signed. Signatures will be deleted before publication at the request of the author. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

OPPOSES DRAFT EXTENSION

To the dentists of the United States: Do you want to live constantly under the suspended sword of the dentists-physicians draft?

Public Law 779, which has authorized the induction of dentists and physicians, will expire this June 30. We all had hoped that this would end the threat of induction. Now I read that the Pentagon has a new bill ready for this expiration date—and who is going to stop it?

Surely it is evident that no conventional organization dares to oppose the Department of Defense. And yet it is within our democratic rights to protest the re-enactment of this bill if we so desire.

Somewhere in the United States a few professional men like myself must foresee the dangers and the evils which may result from the continued policy of taking us, young and old, from our independent practices for military service. To me, it is "socialized medicine" at its worst.

Where are you other men ready to "stand up and be counted" against Public Law 779?

Carlton Brehmer, D.D.S., Sheboygan, Wis.

DANGER TO HEALTH MEASURES

The deliberate malice of some opponents of fluoridation has created a serious health education problem at the present time.

Easily influenced persons leap to the conclusion, after reading sensational anti-fluoridation literature, that destruction of many parts of our bodies will result or that life will be extinguished if we consume fluoridated water. Epidemiologic studies by all eminent scientific professional researchers have proven that such destruction does not result.

Here in Massachusetts the problem is acute. Any inventory of comments by opponents of fluoridation will surely bring to the fore the grave implications of their statements.

It seems that this fluoridation problem has left the informative and stimulative argument of known facts and even freedom of academic discussion.

Now or never, the medical and dental professions must protect the average citizen from oratorical activities and influences that are creating misapprehensions about fluoridation. We must preserve and teach the truthful records, documented facts and scientific research of all public health organizations, for they are becoming targets of attack by biased individuals.

Teaching false assertions is almost a legal violation and surely a moral violation.

Children's dental health is of equal concern to both the medical and dental professions. Advocates of public health measures like fluoridation must begin now to combat the spread of misinformation, the greatest danger to the introduction of health measures.

Clarence W. Wildman, North Adams, Mass.

PLEA FOR OASI COVERAGE

I am writing this letter to ask that you do everything in your power to put practicing dentists under Social Security. It is true that the American Dental Association went on record at the last annual session against this proposal. However, I am sure that if you put it to a popular vote of the members of the Association, they would be overwhelmingly in favor of it.

There are very few dentists who will be able to finance their own security at the age of 65. In the past 12 years it has been practically impossible for a dentist to raise his family, educate his children and also provide for his own declining years; the situation will not change in the foreseeable future.

The average dentist simply cannot build up the necessary capital for his own old age with taxes and inflation as they are.

It is true that some men in the profession

really don't need OASI, but it would be a godsend to the thousands of other men who will need it. You will receive the heartfelt thanks of all these men if you will do everything you can to obtain this legislation.

E. W. Fellows, D.D.S., Seneca, Ill.

THE GRAPHIC STUDY OF MANDIBULAR MOVEMENTS

In the January 1953 issue of THE JOURNAL, LeRoy E. Kurth confused several issues in his reply to my "Criticism of the Graphic Study of Mandibular Movement."[1] It is extremely unlikely that this will mislead the serious student of the subject; however, in case it appears to some that Dr. Kurth has satisfactorily dealt with the points at issue, I should appreciate the opportunity of putting the more important of these back into perspective.

Length and Direction of Tracings • Dr. Kurth wonders why I should discuss the lengths of his tracings when he was concerned with their direction. As is illustrated in Figure 3 of my previous letter, length and direction are so intimately connected in a study of this nature that an error in one clearly reflects inaccuracy in the other.

Dr. Kurth has nowhere explained a method of checking directional tracings to correct for errors introduced by rotation of the condyle.

Three Tracing Points • I deliberately discussed the projection of the path of movement of a single point because I assumed that Dr. Kurth would have taken the precaution of arranging the condylar styluses to radiate from such a point. Spacing of the styluses would, as Dr. Kurth says, greatly affect the length of the tracings. It would also, of course, make them even less reliable for comparative purposes.

Reverse Picture of Direction • Dr. Kurth describes the reversal of the gothic arch tracing following transposition of plate and stylus. I am in some doubt as to his reason for introducing this subject, but imagine the reference to be his explanation of the words already quoted: namely, "the right condyle moved upward in the transverse vertical plane . . . and downward and forward in the sagittal plane." This phenomenon I described as "impossible" and I still consider it to be so.

In his original article Dr. Kurth says the "condyle," not "tracing," shows reverse motion and, moreover, clearly states that both the styluses concerned were attached to the mandible. Under these conditions the type of reversal of tracings to which he refers in his reply does not and cannot occur.

Gothic Arch • I am surprised to note that I am accused of describing the gothic arch tracing device as worthless, particularly in view of the fact that nowhere in my criticism did I refer to it. It would indeed be illogical of me to condemn a method that I myself find of the utmost use. There is, however, a considerable difference between accepting the apex of the gothic arch as an indication of the cessation of one movement and the beginning of another, and believing that its lateral components *accurately* represent anything more than the path followed by the point of the stylus.

A. O. Chick, Ph.D., M.D.S., University of Bristol, England

1. Chick, A. O. Criticism of graphic study of mandibular movement. J.A.D.A. 46:105 Jan. 1953.

DEFENSE OF THE GRAPHIC METHOD

The crux of the dispute between Dr. Chick and me seems to be his contention that "length and direction are so intimately connected in a study of this nature that an error in one clearly reflects inaccuracy in the other." I contend that my studies on the direction of mandibular movements can legitimately and accurately treat of the general direction of the movement without reference to its magnitude. Perhaps I should explain the experiences which led me to this conclusion.

The final design of the face bow used in my study was the culmination of innumerable experimental models. The styluses and tracing plates were placed in various positions to ascertain their best location for obtaining tracings with a minimum of interference during mandibular movement.

It was noted in this preliminary work that the general directions of the tracings on the transverse vertical plane at the incisor point, for instance, were equivalent whether the location of the stylus was at the level of the incisor point or approximately four inches below. The magnitude varied from one position to another. This same situation prevailed at the condylar region; the general direction of the tracing was not affected even though the magnitude was.

Reverse Direction of Tracings • In my previous reply I said that I "commend his interpretation of the tracing on the direction of movement on the transverse plane . . ." I admit my choice of words in the original

article was ill advised wherein I was describing the direction of movement of the "tracing" and substituted the word "condyles."

Gothic Arch • I did not intend to confuse Dr. Chick's criticism by a discussion of the gothic arch which he did not directly mention. He did state, however, that "the graphic method has little value" except "in tracings made in the sagittal plane during mandibular movements performed without any lateral deviation." My interpretation of this conclusion is exactly the same as my previous reply, with the gothic arch used as an example of the great value of a graphic tracing obtained in a horizontal plane.

I am gratified to see that Dr. Chick does not clinically support his own conclusions; he apparently uses a graphic tracing on the horizontal plane. I am also happy to agree with Dr. Chick that the lateral legs of the gothic arch do not "accurately represent anything more than the path followed by the point of the stylus."

L. E. Kurth, D.D.S., Chicago

OASI VS. RELIEF FUND

I have read your editorial, "The Relief Fund and OASI,"[1] and I heartily disagree with you —especially with the sentence ending "after all sides of the issue had been thoroughly studied and weighed by their fellow members."

The economical side was not studied, I think. If it was, the dental profession must have more morons than any other profession.

Old Age and Survivors Insurance provides that when a married person starts collecting his benefit, he is entitled to $120 per month. At three per cent interest, a dentist has to accumulate $48,000 to get an income of $120 per month. How many dentists do you know who have a $48,000 fund from which to draw that $120 per month income?

I haven't heard of any poll taken by the Association to see whether the majority wanted OASI or not. After all, the members of the House of Delegates are the wealthiest men in the profession; they naturally can't see eye-to-eye with the other members, and like all wealthy persons, they look down on the others.

I do not accept with good grace the vote of the Delegates, even though you say the majority voted against OASI, for even the majority may be wrong.

I am sure that members of Congress are going to be petitioned by many dentists to pass a bill giving OASI coverage to dentists, regardless of the vote of the House of Delegates.

I will not give to the Relief Fund, for I believe we would not need such a fund if dentists enjoyed the benefits of OASI.

Benjamin Daniels, D.M.D., Boston

1. Confused logic—the relief fund and OASI. Editorial. J.A.D.A. 45:714 (Dec.) 1952.

Editor's note—In 1951 the Council on Insurance of the Association conducted a survey on the OASI question and found that nationwide opinion among members of the Association was about evenly divided. The House of Delegates in 1951 postponed action since dentists apparently needed to acquaint themselves further with the subject. The House recommended that discussion groups be formed in dental societies for that purpose. Association members were told to instruct their Delegates how to vote on the subject when it was considered at the 1952 annual session. In 1952 the House of Delegates decisively defeated the proposal to include dentists in OASI.

Book Reviews

INTRAVENOUS ANESTHESIA IN DENTISTRY

By S. L. Drummond-Jackson. 140 pages. Bibliography and index. Price $5. London and New York, Staples Press, 1952.

The author presents a strong case in support of intravenous anesthesia for all forms of dentistry. He cites the fact that he has administered anesthetics 20,000 times, for the preparation of 100,000 cavities and a large number of dental extractions. The various chapters include discussions of mode of action, advantages and disadvantages of intravenous anesthesia, equipment and facilities required, technic and opinions of other workers in the field of anesthesia in dentistry.

Considerable space has been utilized to advocate with great enthusiasm the advantages of intravenous anesthesia over nitrous oxide or local anesthesia. In many places, one gains the impression that the text is more of an editorial than a book.

In contrast to the present trend in the United States, the author employs a single, rapidly administered intravenous injection and then completes his work while the drug is effective. This, of course, calls for considerable speed, and the author describes a very efficient method of nurse assistance at the chair. This consists primarily of employing interchangeable straight and contra-angle handpieces, with various burs and stones already in place.

A typical dental appointment is described, in which six cavities are prepared and lined under anesthesia during a 30 minute period. This is followed by a similar length of time for recovery. Following recovery, the patient is replaced in the dental chair and the fillings are inserted. Carbide burs and air spray are liberally employed throughout.

Recognition and treatment of possible complications are covered by the author although he feels that they are very infrequent when the drug is administered with care and skill. Mouth to mouth breathing is described as a means of resuscitation when respiration ceases. In the opinion of the reviewer, it would be wiser to employ adequate resuscitation equipment.

The author has brought forth an interesting technic, one which will undoubtedly increase in favor and usage over a period of years. However, adequate educational and training facilities must obviously be developed if such a movement is to proceed with recognition and safety. It is obviously the intent of the author to present one side of a controversial subject in an attempt to stimulate interest in his chosen subject. In this he has been successful.

Fred A. Henny

NEW AND NONOFFICIAL REMEDIES

Issued under the direction and supervision of the Council on Pharmacy and Chemistry of the American Medical Association. 1952 edition. 884 pages. Index. Price $3. Philadelphia, J. B. Lippincott Co., 1952.

This authoritative and reliable book is published annually. Metabolic fate, mechanism of action, uses, dosages and side effects of a large number of drugs are described. Emphasis is on new preparations, to the almost complete exclusion of many important older drugs such as, for example, morphine, acetylsalicylic acid, procaine and phenol. Obviously it is only by such selection of emphasis that the book can be kept compact enough to serve its prime purpose: to provide reliable and readily available information concerning new remedies not yet described in official compendia.

Almost one third of the book is devoted to physical and chemical specifications for drugs most of which are not described in *Pharmacopeia of the United States* or *The National Formulary*. The major portion of the book is divided into chapters, each of which consists of one or more groups of descriptive monographs. Commercial products accepted by the Council on Pharmacy and Chemistry are listed at the end of each monograph.

The information on histamine-antagonizing agents, local anti-infectives, sulfonamides, antibiotics, anticoagulants, central nervous system depressants, hormones and synthetic substitutes and skeletal muscle relaxants has been revised extensively. There has been very little alteration in the chapter on vitamins.

Among the more than 24 new monographs are descriptions of terramycin hydrochloride, acet-dia-mer sulfonamides, sodium sulfacetamide, secobarbital, thiamylal sodium, corticotropin, cyclamate calcium, hyaluronidase and three antihistamines. At least fourteen monographs which were in the 1951 edition have been omitted from this edition.

New and Nonofficial Remedies differs from the major texts in pharmacology and therapeutics in three important respects. It is more up-to-date because it is revised annually. It is more compact, partly because only the newer drugs are extensively described and partly because no effort is made to cover all of the aspects of pharmacology and therapeutics. In general, the information it contains is more reliable because of the array of highly qualified individuals who donate their services in the preparation of the book and because many errors which tend to appear in newer texts have been eliminated in the course of its forty-five or more annual revisions.

New and Nonofficial Remedies is a suitable reference and supplemental textbook for students and practitioners in dentistry, medicine and pharmacy. In order to derive the maximum benefit from the book, the latest revision should always be available. Its low cost makes a new copy each year a practical investment.

1952 YEAR BOOK OF DENTISTRY

By Stanley D. Tylman, Donald A. Keys, John W. Knutson, Harold J. Noyes, Hamilton B. G. Robinson, Carl W. Waldron. 519 pages with 315 illustrations. Index. Price $5.75. Chicago, The Year Book Publishers, Inc., 1953.

Articles from the dental periodical literature from September 1951 through August 1952 have been selected and digested by an editorial board of six specialists in the branches of dentistry covered in this volume. Material is grouped as follows: prosthetic dentistry; operative dentistry; public health; orthodontics; oral pathology and oral medicine; oral surgery.

Selections range in length from a few paragraphs to several pages, but even the shorter digests appear comprehensive enough to be of real informative value. Short comments by the editor of the section follow each entry.

Periodical dental publications of the United States furnish the bulk of material included, although some foreign journals are listed, as well as publications from allied fields. It is apparent that magazines specializing in the particular subject under discussion have been used as source material for that particular section of the *Year Book*. For example, in the public health section dealing with fluoridation one finds selections from such magazines as: *American Journal of Public Health, New England Journal of Medicine, Journal of Dental Research, Science* and THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. Excerpts for the orthodontic section are drawn from such publications as: *Angle Orthodontist; American Journal of Orthodontics* and the *Dental Record*, a British journal which usually carries considerable orthodontic material.

The same size and format of the preceding annual volumes have been maintained. Paper is of a quality to permit constant use of the book for reference, and the many illustrations are clear. Type size is easy on the eyes. There is an index of titles and an author index.

Like other volumes of the dental *Year Book* series, this issue is a convenient guide to the extensive dental literature. It provides an overall picture of current dental writing in an easy-to-take capsule form.

Martha Ann Mann

PREVENTIVE MEDICINE AND PUBLIC HEALTH

By Wilson G. Smillie. Second edition. 603 pages. Index. Price $7.50. New York, The Macmillan Co., 1952.

The terms *preventive medicine* and *public health* have often caused confusion because of the lack of clear-cut definitions. Dr. Smillie proposes this distinction:

"The difference is not one of purpose nor of results . . . but rests in the avocation of responsibility . . . Public health encompasses those activities that are undertaken for the prevention of disease and the promotion of health, which are primarily a community responsibility . . . Preventive medicine encompasses those activities that are the direct responsibility of the individual in the prevention of disease and in the protection and promotion of the health of himself and his family."

Dr. Smillie, a physician, prefers the term oral hygiene to dental hygiene since, in his opinion, "Dental hygiene involves an analysis of the underlying causes of the conditions that are encountered. Preventive measures must be directed toward the elimination of the basic causes that produce a general infection or other abnormal conditions which may first manifest itself as an oral lesion."

Dr. Smillie briefly (in five pages) discusses dental caries, nutrition and dental caries, dental care, education and oral hygiene, health department dental clinics and dental insurance. Perhaps future editions will treat oral problems in more detail.

In the chapter "Adequacy of Medical Care" he reminds the reader that "the difficulty has been that no one has been willing to face the high cost of adequate dental care. Prepayment plans for dental care are elimi-

nated from most plans of health insurance. This is an anomalous situation since dental care is one of the most predictable of all insurance risks."

Exactly, and because of its universal need, dental care would seem to be uninsurable. Patients in the immune category or those with the probability of having limited treatment refuse to pay premiums to help those expecting extensive dental operations to obtain treatment at low cost. Incidentally, the cost estimates for dental care cited by Dr. Smillie are of 1944 vintage and must therefore be considered at least 50 per cent low.

J. M. Wisan

MY FRIEND, THE DENTIST

By A. K. Ovadia. First edition. 57 pages, illustrated. No price listed. Rome, Italy, Danesi, 1952.

Drawings by Susanne Suba, whose illustrations have charmed many a reader of the *New Yorker*, will entice adult and child alike into more than a cursory perusal of this new Italian publication in the field of dental health education.

The text is aimed at the wiggly-tooth age which, in America, would be school children in the first and second grades. Little Jimmy is asked to tell his fellow classmates about his visit to Dr. Winslow, who is on his way to the school to talk to the pupils about dental health and care. Little Jimmy's experiences are elaborated on by the dentist, and he finds his audience has an unusual interest in and knowledge of dentistry. The pupils ask questions ranging from "Why do Johnny's teeth stick out?" to a query on partial dentures.

Both parents and teachers will find the book helpful: to parents, it will provide a storybook approach for explaining to their offspring the need for dental hygiene; to teachers, it will offer source material for the study of dental hygiene as well as preparation for a visit from the dentist or dental hygienist.

The English edition has been limited to 500 copies.

Marian Driscoll

THERAPEUTIQUE DENTAIRE

By Antoinette Landon. 130 pages with no illustrations. Paris, Julien Prelat, 1952.

The author of this monograph is neither a physician nor a dentist, but a pharmacist with a doctor's degree in pharmacy. The book is a methodical compilation of known facts related to dental therapeutics. Although the author apparently has done a great deal of research in the preparation of this publication, she does not seem to have read some of the latest articles and texts published in this country on the subject.

The work is an attempt to write in French a treatise on specialized dental therapeutics, to supplement texts in which the subject of dental therapeutics is only a minor part of general therapeutics.

The book is divided into three parts. The first part is a sketchy historical account of the development of dentistry from the prehistoric time to Ambroise Paré. The second part deals with the different groups of therapeutic agents used by the dental profession. The third part, entitled "Practical Advice," enumerates the drugs used in dentistry. In this section there is also a short chapter on tooth paste, another on sterilization and a final chapter on the French Statutes, in which the author attempts to outline the field of action of dentistry.

The scope of this book is so vast that its content is limited. It is a far cry from what we would consider a scientific treatise. In the light of our own publications the book is a superficial sketch of the whole field of dental therapeutics.

Rene Rochon

ORTHODONTICS: DIAGNOSIS, PROGNOSIS, TREATMENT

By Bercu Fischer. First edition. 334 pages with 1180 illustrations on 212 figures. Index. Price $12. Philadelphia, W. B. Saunders Co., 1952.

Changing concepts in orthodontic treatment during the last 20 years have revised many of the old established practices in the correction of malocclusion, whether in diagnosis, appliances, esthetics or extraction. In this text, Dr. Fischer gives his interpretation of these changes based on methods found successful in his clinical practice.

The recurrent problem in all orthodontic treatment is the establishment and conservation of adequate anchorage. Fischer discusses the various forms of intraoral anchorage and finds them lacking. His conclusion is that intramaxillary or intermaxillary traction is indicated only in those cases requiring reciprocal movement of teeth.

For conditions in which sufficient intraoral anchorage cannot be secured, Fischer advocates occipital force and sectional treatment to localize the pressure and confine it to teeth actually being moved. In this manner, he be-

lieves, potential damage to roots and supporting structures can be reduced, and more pleasing and permanent corrections can be achieved.

Unfortunately Fischer limits his discussion to diagnosis, prognosis and treatment. Missing are chapters of equal importance in orthodontics—for example, etiology, development and prevention. It is doubtful that he intended to put so explicitly his statement on page 63 that ". . . etiology plays practically no part in the treatment of Class II, Division 1 malocclusion."

Earlier comment on page 9 stresses elimination of finger, thumb and tongue sucking habits if the correction is to remain permanent. To these, lip biting, mouth breathing, and abnormal swallowing habits could have been added.

A major portion of the book is devoted to a technical description of the appliances he employs. This includes sectional treatment with the edgewise appliance and the use of the headcap and "occipital bow" attachment to provide extraoral anchorage. Adding materially to the textual description is the general excellence of the illustrations, including facial photographs, models, appliances and schematic drawings.

B. F. Dewel

TRANSACTIONS OF THE CONFERENCE ON MORALE—AND THE PREVENTION AND CONTROL OF PANIC

Conference held under joint auspices of New York Academy of Medicine and the Josiah Macy, Jr., Foundation. 75 pages. New York City.

This conference was directed toward the understanding of the problems of individual and mass anxiety, fear and panic. It was specifically concerned with the situation which might arise if war, especially atomic warfare, came to this continent and affected the American people directly. The participants in this conference were well qualified psychiatrists and others, many of whom had personal experience in European wars where they had observed the morale of people under attack.

Building of the morale of people to withstand catastrophe is stressed as the greatest preventive against panic and even as a deterrent to war. Panic arises from frightening experiences which are outside the bounds of ordinary experiences or way of life. Some people can adapt themselves to such experiences better than others.

In any mass atomic attacks on a principal city, perhaps not more than three per cent of the population will actually be injured. It is the other 97 per cent that must care for the casualties and clean up the rubble. They must maintain a high level of morale and face the situation with courageous hearts—all for one and one for all.

The chief cause of panic is anxiety over the unknown. Most people can face realities if they are known. Therefore, in any catastrophe the greatest morale builder is publicity and dissemination of authentic information.

There is too little public participation in the Civil Defense program. There is too much apathy which in time of stress will lead to confusion. Adequate civil defense, under strong leadership, will teach the people that they can protect themselves from disaster and will build the strongest public morale.

R. W. Bunting

TOPICS ON PHYSICAL CHEMISTRY

By W. Mansfield Clark. Second edition. 777 pages with tables, figures and references. Index and 4 appendixes. Price $10. Baltimore, Williams and Wilkins Co., 1952.

Physical chemistry deals with that area of scientific knowledge where physics and chemistry overlap, and familiarity with certain physicochemical concepts and principles is required for the successful study of biochemistry, physiology, pharmacology and microbiology, as well as of dental materials. Usually when these subjects are taught to dental and medical students, physicochemical considerations are outlined briefly as they relate to the course material at hand; frequently an "introductory" textbook of physical chemistry is prescribed as a supplement.

Clark's book, subtitled "A Supplementary Text for Students of Medicine," emphasizes topics with which the student of elementary biochemistry and the maturing student of medical science will be most frequently concerned. In addition to chapters concerning such fundamentals as the gas laws, laws of mass action, thermodynamics and oxidation-reduction, there are sections devoted to membrane phenomena, protein solutions, blood electrolytes and colloid chemistry, with emphasis upon biological applications.

The discussions of the principles and the instruments involved in measuring mass, volume, diffusion and pH, and the portions dealing with atomic structure, isotopes, spec-

trophotometry and polarography are valuable lessons in precise scientific thinking, quite apart from their technical usefulness.

Although physical chemistry is largely mathematical, this book is written so that concepts may be grasped without extensive mathematical background. It is well documented, for the benefit of the student interested in further detail. It abounds with colorful analogies and humorous interjections which make for easy reading and learning.

For the dental student or graduate who desires to probe more deeply into problems related to dental science this book will be a valuable aid.

Sholom Pearlman

GINGIVITIS IN MILITARY PERSONNEL WITH SPECIAL REFERENCE TO ULCEROMEMBRANOUS GINGIVITIS

By J. J. Pindborg. Reprinted from Odontologisk Tidskrift, Volume 59, Number 6, pp. 407-499, 1951. Translated from Danish by Axel Andersen. Copenhagen, C. A. Reitzel, 1952.

This monograph was translated from Danish into English by a Dane. The resulting language is not idiomatic but is delightfully quaint, very readable and easily understood. The main thesis revolves around the prevalence of (a) simple chronic marginal gingivitis and (b) ulceromembranous gingivitis as determined from the oral examination of 9,659 Danish enlisted men by the author. In addition, Pindborg presents an excellent and exhaustive review of the literature on the epidemiology of gingivitis (Chapter 1 and 2).

The results of Pindborg's investigations are carefully presented in detail in four subsequent chapters. He found significant correlations between the occurrence of ulceromembranous gingivitis and the season, age, occupation before enlistment and oral care during childhood. Extensive data are presented in relation to the quadrant of the jaw attacked, the presence of calculus, areas of food impaction, irregular position of the teeth, toothbrushing, presence of third molars and the consumption of tobacco. He found no relation between smoking and simple gingivitis but a strong correlation between the amount of smoking and ulceromembranous gingivitis. Finally, he confirms other reports that the incidence of ulceromembranous gingivitis rises significantly when the men are transferred to camps or ships.

This brochure represents a major contribution to the scientific literature on the epidemiology of gingivitis (especially ulceromembranous gingivitis). The presentation and statistical treatment of the data are made with great care. Pindborg is to be congratulated on his statistical collaborators. Pindborg informs me that he will send a copy of this monograph to any qualified dental investigator who requests one.

Maury Massler

CRUELTY TO CHILDREN

By Eustace Chesser. 143 pages with appendix tables concerning research. Price $3.75. New York, The Philosophical Library, Inc., 1952.

Dr. Chesser in his foreword sets forth the philosophy which motivates this book: "It is my conviction, founded upon both scientific and philosophic grounds, that the major ills of our civilization spring, not so much from mismanagement or from ill intentions on the part of those directing nations' destinies, as from the cumulative effect of the unbalance and strife within each individual human heart and life."

The author points out that he has attempted to draw a sketch of some of the major evils which exist. His statistics and records represent warped and unhappy parents and children—a challenge to society.

The research is laid in England, but this reviewer feels it might have been laid in America, as our own papers are full of similar stories. There are three parts: the first deals with the personal background to the problem of cruelty. In this section the author explains the magnitude of the problem, the types of cruelty, the influence of overburdened motherhood, broken homes and rejection of one or both parents. Cases are used to introduce each chapter.

Part two deals with the influence of leisure and recreation and points out very clearly that cruelty to children is one of the many neuroses of civilization. According to the author, others include smoking, drinking, drug addiction and sexual deviation.

Part three discusses the question of responsibility, punishment and treatment. Dr. Chesser urges that there be a differentiation between neglect and cruelty. He pleads for understanding and for some public child welfare agencies.

He urges for England a Children's Charter, even a Minister for Children and machinery which will deal with prevention, rather than later punishment.

This book will help us in America realize how much progress we have made through federal, state and private agencies—and White House Conferences, the Children's Bureau, child welfare agencies and the Juvenile Court. It will also challenge us to continue our work in the field of family life education.

Sora Barth Loeb

BARTHOLOMAEUS EUSTACHIUS' LIBELLUS DE DENTIBUS. REPRINT OF THE FIRST EDITION (1563) AND TRANSLATION INTO GERMAN WITH ANNOTATIONS

Translated by Fritz Driak. 212 pages with one illustration. Price $7.50. Vienna-Innsbruck, Urban & Schwarzenberg, 1951.

The greatest achievement in the dental field up to the close of the sixteenth century was the establishment of dental anatomy as a science. The knowledge of dental disease and the repertory of dental procedures which had previously developed were, unlike dental anatomy, destined to be revised and revolutionized many times in the succeeding centuries. Dental anatomy had, for the most part, merely to be elaborated and refined.

The outstanding accomplishment in dental anatomy is epitomized by the work of the great Italian, Bartholomew Eustachius. His *Libellus de Dentibus (The Little Book of the Teeth)* first published in 1563 was the earliest book entirely devoted to dental anatomy. It consists of 30 chapters dealing with all aspects of the anatomy of the teeth. It has never appeared in an English version, but it was translated by G. H. Bisseling into Dutch several decades ago. In the present volume, Fritz Driak, director of the Dental Institute of the University of Vienna, has given the world not only a facsimile of Eustachius' entire book, but a translation into German that will make it accessible to many more students of the history of anatomy than formerly.

The book is furnished with a short biography of Eustachius and illustrated with his portrait. An attractive imitation leather binding gives the volume appropriately the appearance of antiquity. Dr. Driak's admirable contribution to dental literature should be especially appreciated emanating at this time from the midst of war-impoverished Europe.

G. B. Denton

WATER

By Sir Cyril S. Fox. First edition. 143 pages with 25 photographic illustrations and 4 text figures. Index. Price $8.75. Philadelphia, Philosophical Library, Inc., 1952.

This treatise on water has been prepared as the initial volume of a series of books to meet the current need for information on the various aspects of water supply. This book treats the subject in three general parts, (1) the natural history of water, (2) the work done by water, and (3) the utilization of water.

The first part (65 pages) covers constitution, distribution and circulation of water in a complete but concise manner. The physical properties of water are fully defined and compared with other substances to show their relationships. Analyses document the chemical quality of the waters of the earth. Distribution and approximate quantities of water in the atmosphere, oceans, rivers, lakes, ice caps and in the soil and rock are interestingly estimated. The chapter on circulation of water explains the hydrologic cycle on a quantitative basis.

The second part (50 pages) divides the work done by water into erosion of the land surfaces, the action of underground water and the deposition of sediments. The quantitative analysis of these actions should give every serious-minded person reason to pause and re-examine the situation. No doubt, the control of the destructive actions of water constitutes one of the major problems of our times and will become more accurate as the food needs of the world increase.

The final part of the book (20 pages) very briefly and perhaps inadequately discusses the utilization of water. The quantitative analysis continues by indicating the hydroelectric potential of the world. The book closes with a discussion of two significant subjects, water rights and the national aspects of water supply.

The object of this treatise was to conduct the reader from the theoretical to the practical aspects of water supply and utilization. This objective has been achieved with some success considering the size of the book. The brevity of the book should make it attractive to many people who need a basic understanding of water in all its phases. It is recommended reading to engineers, teachers, and all persons that are interested in their surroundings.

Raymond J. Faust

Current Literature

THE PEDIATRICIAN AND THE DENTIST

A. G. Watkins. Brit. D. J. 94:7 Jan. 6, 1953.

Pediatricians and dentists, who have many problems in common, should consider the child as a whole when making an examination.

Difficulties in the primary dentition have been exaggerated, and changes to the permanent dentition have been minimized. Occasionally a child is born with erupted teeth which usually should be removed to prevent traumatic injury to the mother and infant during nursing. Diagnosis is difficult in minor illnesses of babies; many ailments are blamed on teething. Lancing, with risk of sepsis, is never justified, since salivation may be present. In a healthy infant convulsions are never caused by teething.

The period of physiological growth changes during which the permanent dentition develops is associated with indirect disturbances which should be recognized by both physician and dentist.

Severe caries is present frequently in the deciduous teeth of mentally defective and spastic children. This condition proves the value of jaw exercise for cleansing and preserving the teeth and may be a reflection of maternal care. Mouth hygiene and vitamins are of questionable value if a child is unable to use his teeth and jaws for their intended purpose.

Necessity of consultation may arise because of abnormal shedding of teeth in young children. Such shedding may occur in a condition called pink disease (acrodynia), of which little is known as to etiology and treatment. Attempts have been made to prove that mercury is a causative factor. It is true that teething powders are frequently prescribed by physicians and dentists. There is evidence that teething powders are harmful.

Gingivitis and stomatitis are observed frequently in children of all ages, especially those in the permanent dentition group. The herpes virus and the riboflavin deficiency may be causative factors. The Stevens-Johnson syndrome of erythema multiforme presents difficulties of treatment. Bland mouthwashes and a solution of 1 per cent gentian violet may prove valuable therapeutic aids. Other septicemic conditions may show symptoms of gingivitis and stomatitis. Penicillin lozenges have been responsible for some cases of stomatitis.

Close cooperation between the physician and the dentist is most important in cases where extractions are performed for children with heart disease. There is extreme danger of dissemination of organisms from the site of extraction to the affected heart. Preoperative and postoperative treatment with penicillin is indicated for cases where heart disease is known or suspected.

Boys with hemophilia present a serious problem. Loose teeth should be allowed to drop out. Transfusions must be given when extraction is required. Frequent dental attention to prevent loss of teeth is of paramount importance for all hemophiliacs.

A certain number of cases requiring orthodontic care result from a general skeletal character. This aspect should be kept in mind. A child should not be referred for orthodontic treatment without full cognizance of underlying pathologic conditions.

Many other examples might be quoted to illustrate the value of treatment of the child as a whole by both the pediatrician and the dentist, pooling their professional resources.

Joseph F. Burket

OBSERVATIONS IN CLINICAL PREVENTIVE DENTISTRY

John Miller. Brit. D. J. 94:9 Jan. 6, 1953.

Two separate studies were made: (1) The clinical records of 699 children aged 5 to 14 years were studied to determine the variation in times of eruption of the permanent teeth. (2) The clinical records of 157 children were studied to determine the time between the eruption and the appearance of decay in the permanent teeth.

In the first study a tooth was recorded as erupted if, in the case of incisors, at least half the labial surface was visible, and in the case of the posterior teeth, half the occlusal surface. The results of this investigation are presented in a table, which illustrates considerable variation between children in the age of eruption of any one permanent tooth. The average age of eruption of the teeth in this group does not vary much from the accepted age of eruption.

In the second investigation the study was confined to the first and second permanent

molars. Caries was diagnosed on cleaned dry teeth with a sharp probe. The smallest lesion recorded as caries was that which was detected when the probe stuck in the pit or fissure with light pressure. Examinations for diagnosis of decay were made every six months. The results of these examinations are recorded in a second table. From these observations it appears that caries commences early in the mouth life of these teeth. Approximately 25 per cent of the caries was diagnosed at the first inspection, and 25 per cent was observed six months after the first inspection. No evidence was observed that premature eruption of a tooth predisposed to early decay in that tooth. Clinical preventive measures for pit and fissure caries can succeed only in a limited percentage of cases. Measures should be designed to control and arrest the progress of such decay.

Joseph F. Burket

THE USE OF SELF-CURING RESINS IN PROSTHETIC DENTISTRY

John Osborne. Brit. D. J. 93:309 Dec. 1952.

From a review of the literature and personal experiences with self-curing resins in the field of prosthetics, it appears that these resins are most valuable for emergency repairs. Their physical properties indicate that they should not be used for denture construction or major repairs. They are useful for tooth replacements, repairs of small cracks and other nonstress-bearing repairs. They have possibilities for direct relining and rebasing, particularly for partial denture saddles and full lower dentures. A technic for this purpose is in the experimental stage.

PRESENT STATUS OF CONCEPT OF FOCAL INFECTION

George H. Coleman. J.A.M.A. 151:280 Jan. 24, 1953.

After an initial overenthusiasm in the early development of theories of focal infection, there came a healthy skepticism which led to much clinical and experimental research; for a time the concept of focal infection was almost abandoned. In dentistry the focal infection theory did a great deal of good as well as harm, for it brought about a reform in operative and prosthetic procedures. In the prophylaxis of diseases due to focal infection, dentists have a keen realization of their responsibility in keeping the oral cavity as free from infection as possible. This is common ground for a closer cooperation between the medical and dental professions.

The last 15 years have brought further clarification and understanding of the problems of focal infection. After much controversy and as a consequence of continued research and clinical study by physicians, dentists and other scientists, the concept of focal infection has become an accepted principle in the practice of medicine and dentistry.

Charles W. Freeman

THE TIMING OF TREATMENT IN ORTHODONTICS

D. H. Jenkins, J. T. Crouch, W. K. Shultis, L. E. Riddolls and G. Nikiforuk. Am. J. Orthodont. 39:13 Jan. 1953.

In view of the present stress on undergraduate teaching of preventive orthodontics, it becomes necessary for the specialists and teachers in this field to reach some conformity of opinion as to the strategic use of the time factor in treatment.

The principles of treatment timing are: (1) to prevent the development of an orthodontic anomaly and (2) to treat a developed or unpreventable anomaly with maximum advantage to the patient in terms of cost, convenience and results.

The initial fact evident in this study is that orthodontists need to find a fundamental basis in diagnosis and treatment planning. Since orthodontic anomalies are reasonably viewed as disturbances of dentofacial physiology, it is necessary first of all to determine what are the basic types of physiologic disturbances.

Three basic types of physiologic aberration can be recognized: (1) a functional displacement of the mandible when the teeth are in occlusion, (2) a deformation of the dental arches on a structural basis and (3) a dimensional malrelation between the total mesiodistal width of the teeth and the dental space available for them.

Most malocclusions manifest two or more of these basic types. An evaluation of the treatment possibilities for each basic type of malocclusion is of primary importance. Such an evaluation should be the basis of treatment planning for all types in the Angle classification.

Primary factors in treatment are first, early accurate diagnosis and second, selection of the appliance for the individual case rather than the case for the appliance.

William F. Ford

Deaths

Andrew, Harry R., Livingston, Wis.; Dental School, Marquette University, 1910; died January 25; aged 65.

Arata, William A., Jersey City, N. J.; New York College of Dentistry, 1923; died January 7; aged 51.

Auerbach, Samuel, Philadelphia; Pennsylvania College of Dental Surgery, Philadelphia, 1909; died January 3; aged 64.

Barsness, Melvin H., Superior, Wis.; Dental School, Marquette University, 1911; died January 7.

Beck, Arvey J., Cleveland; School of Dentistry, Western Reserve University, 1919; died January 8; aged 56.

Becker, George H., Washington, D. C.; School of Dentistry, Georgetown University, 1910; died December 24; aged 66.

Berry, John B., Independence, Mo.; Kansas City-Western Dental College, 1905; died January 6.

Betzig, Edward P., New York; New York College of Dentistry, 1904; died December 23; aged 70.

Bloom, Abraham B., Rochester, N. Y.; Dental School, Northwestern University, 1907; died January 16; aged 75.

Boyles, Francis M., Dayton, Ohio; Cincinnati College of Dental Surgery, 1909; died December 20; aged 63.

Brodeen, Runo G., Stillwater, Minn.; Indiana Dental College, 1918; died December 24; aged 62.

Bruce, Robert J., Erie, Pa.; School of Dentistry, Temple University, 1935; died January 14; aged 40.

Buck, Adelbert B., Wichita, Kan.; School of Dentistry, University of Denver, 1912; died in January.

Buck, Eugene K., Youngstown, Ohio; College of Dental Surgery, University of Michigan, 1926; died December 30; aged 52.

Burgess, John C., Wellington, Mo.; School of Dentistry, St. Louis University, 1905; died December 13.

Carolus, Irvin B., Sterling, Ill.; American College of Dental Surgery, Chicago, 1892; died January 1; aged 85.

Carrick, William S., Interlaken, N. J.; School of Dentistry, Temple University, 1909; died January 24; aged 67.

Cassidy, James J., Cambridge, Mass.; Dental School, Tufts College, 1922; died January 27; aged 55.

Cody, Henry G., Oneida, N. Y.; School of Dentistry, University of Buffalo, 1904; died December 19; aged 71.

Collins, John N., Malden, Mass.; Dental Department, Baltimore Medical College, 1911; died January 1; aged 62.

Connors, John T., Joliet, Ill.; Chicago College of Dental Surgery, Loyola University, 1908; died November 11.

Cotton, Lee H., Perry, N. Y.; School of Dentistry, University of Buffalo, 1906; died January 20; aged 74.

Courrier, John L., East Orange, N. J.; New York College of Dentistry, 1902; died February 6; aged 75.

Craddock, Robert W., Louisville, Ky.; School of Dentistry, University of Louisville, 1942; died January 24; aged 36.

Culbertson, Harry, Bozeman, Mont.; Dental School, Northwestern University, 1919; died December 18; aged 57.

Cunningham, James A., Albany, N. Y.; School of Dentistry, University of Buffalo, 1919; died November 14; aged 56.

Cunningham, Thomas J., Manchester, Ohio; died January 19; aged 57.

Denig, Walter W., Monroe, Mich.; died January 16; aged 59.

De Riemer, Albert E., Chicago; Chicago College of Dental Surgery, Loyola University, 1906; died January 8; aged 78.

Donaldson, Lewis M., West Newton, Pa.; Baltimore College of Dental Surgery, 1897; died January 15; aged 79.

Doyle, Harold W., West De Pere, Wis.; Dental School, Marquette University, 1923; died November 27; aged 54.

Drummond, Charles E., Marion, Iowa; American College of Dental Surgery, Chicago, 1890; died January 5; aged 93.

Durand, Williams S., Marshall, Mich.; College of Dental Surgery, University of Michigan, 1903; died January 8; aged 74.

Ellis, Raymond W., Salem, S. D.; Dental School, Northwestern University, 1917; died December 19; aged 59.

Epes, Beverley M., Blackstone, Va.; Atlanta Dental College, 1915; died February 12.

Erskine, Donald C., McGregor, Minn.; College of Dentistry, University of Minnesota, 1931; died January 2; aged 52.

Ettenson, Herman, New York; School of Dentistry, University of Pennsylvania, 1909; died December 6; aged 71.

Exon, George E., Wichita, Kan.; Dental School, Northwestern University, 1908; died February 2; aged 69.

Finley, John H., Seattle; College of Dentistry, University of California, 1900; died January 3; aged 80.

Fish, Edson K., Boston; Dental School, Tufts College, 1900; died December 15; aged 89.

Ford, James D., Newark, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1899; died December 9; aged 78.

Fordham, Walter H., Scranton, Pa.; School of Dentistry, University of Pennsylvania, 1898; died February 6; aged 75.

Freelund, Gustav R., Chicago; Dental School, Northwestern University, 1912; died January 24; aged 68.

Garrity, James C., Green Bay, Wis.; Dental School, Marquette University, 1923; died October 20; aged 54.

Gauz, Maurice J., Freeland, Pa.; School of Dentistry, Temple University, 1931; died January 26.

Geddes, Donald D., Minneapolis; College of Dentistry, University of Minnesota, 1917; died January 3; aged 58.

Gentry, Curtis H., Spartanburg, S. C.; Atlanta-Southern Dental College, 1931; died January 16; aged 47.

Ghio, Humbert S., St. Louis; School of Dentistry, St. Louis University, 1912; died January 12; aged 62.

Gibson, Noley W., Kosciusko, Miss.; Southern Dental College, Atlanta, 1914; died January 23; aged 67.

Giles, William F., Omaha; College of Dentistry, Creighton University, 1922; died December 22; aged 56.

Gochenour, Jeremiah, Monticello, Ind.; Chicago College of Dental Surgery, Loyola University, 1892; died January 24; aged 84.

Granelli, Victor A., Hoboken, N. J.; New York College of Dentistry, 1918; died January 15; aged 57.

Grant, Donald J., Canby, Ore.; School of Dentistry, North Pacific College of Oregon, 1929; died December 23; aged 49.

Graves, Henry W., New York; New York College of Dentistry, 1891; died January 20; aged 85.

Hildreth, Leon W., Lynnfield Center, Mass.; died January 17; aged 65.

Hoblit, Noel E., Illmo, Mo.; School of Dentistry, St. Louis University, 1938; died November 22; aged 45.

Hodges, Fred S., Bennettsville, S. C.; Louisville College of Dentistry of Centre College, 1897; died December 26; aged 86.

Howes, Louis C., Wyoming, N. Y.; School of Dentistry, University of Buffalo, 1914; died September 27; aged 63.

Hyatt, Thaddeus P., Stamford, Conn.; New York College of Dentistry, 1888; died December 15; aged 88.

James, Edwin P., Berkeley, Calif.; College of Physicians and Surgeons, San Francisco, 1903; died December 15; aged 79.

Jenkins, George S., New Castle, Pa.; School of Dentistry, University of Pittsburgh, 1931; died September 11; aged 44.

Kalin, Jerome, Newark, N. J.; College of Dentistry, New York University, 1938; died December 23; aged 39.

Kelly, Charles G., Hannibal, Mo.; Ohio College of Dental Surgery, University of Cincinnati, 1900; died September 9.

Kemink, Claude J., Muskegon, Mich.; College of Dental Surgery, University of Michigan, 1934; died December 17; aged 42.

Kennedy, William M., York, S. C.; Atlanta Dental College, 1901; died December 1; aged 78.

Kerr, Charles H., Saginaw, Mich.; Dental School, Northwestern University, 1907; died December 4; aged 71.

Kozlowski, Florian S., Chicago; Chicago College of Dental Surgery, Loyola University, 1926; died December 28; aged 49.

Kreisler, David, New York; New York College of Dentistry, 1897; died October 28.

Lane, Harry W., Springfield, Ill.; School of Dentistry, St. Louis University, 1914; died November 28.

Langston, James G., Magnolia, Ark.; Atlanta Dental College, 1900; died November 25.

Lawrence, Robert J., Adamstown, Pa.; School of Dentistry, University of Pittsburgh, 1952; died November 30; aged 26.

Layne, James T., Jamestown, N. D.; College of Dentistry, University of Minnesota, 1906; died November 4; aged 71.

Levins, Harold P., Elizabeth, N. J.; School of Dentistry, St. Louis University, 1931; died January 3; aged 44.

Luby, Frank M., Springfield, Mo.; School of Dentistry, St. Louis University, 1925; died August 23; aged 50.

Lundberg, George W., St. Paul; College of Dentistry, University of Minnesota, 1923; died October 21; aged 57.

Mackintosh, Albert I., New London, N. H.; Dental School, Harvard University, 1900; died November 6; aged 74.

May, Francis A., Maynard, Mass.; died December 13; aged 64.

McCaffrey, Francis S., New York; New York College of Dentistry, 1915; died December 26; aged 64.

McCall, Roderick M., Lyons, Ga.; Atlanta Dental College, 1916; died November 1; aged 58.

McChesney, Clinton L., Pittsburgh; Pittsburgh Dental College, Western University of Pennsylvania, 1899; died December 18; aged 77.

McDougall, Charles D., Petersburg, Ill.; Chicago College of Dental Surgery, Loyola University, 1895; died November 12.

McGrath, James F., Brookline, Mass.; Dental School, Tufts College, 1915; died November 17; aged 62.

McKinney, James W., Kansas City, Kan.; Kansas City Dental College, 1909; died December 7; aged 78.

McNeeley, Gail J., Cleveland; School of Dentistry, Western Reserve University, 1925; died December 9; aged 49.

Meinwald, Herman, Brooklyn; New York College of Dentistry, 1916; died October 18; aged 62.

Meyer, William A., San Francisco; College of Dentistry, University of California, 1889; died December 11; aged 85.

Mohn, Pern T., Jenkintown, Pa.; School of Dentistry, University of Pennsylvania, 1919; died October 30; aged 59.

Mouser, Charles F., Evarts, Ky.; School of Dentistry, University of Louisville, 1921; died December 24; aged 59.

Moyer, Nora, Takoma Park, Md.; Dental Department, National University, Washington, 1895; died December 18; aged 87.

Munger, Wilbur H., Piqua, Ohio; College of Dentistry, Ohio Medical University, 1900; died November 30; aged 87.

Nortell, Harry L., Tucson, Ariz.; Dental School, Northwestern University, 1922; died September 5; aged 66.

Ohm, William H., Minneapolis; College of Dentistry, University of Minnesota, 1912; died October 27; aged 65.

Peck, Louis A., Bridgeport, Conn.; died November 28; aged 80.

Pederson, John E., Seattle; School of Dentistry, North Pacific College of Oregon, 1917; died December 13; aged 58.

Pierce, Opal J., Inverness, Fla.; School of Dentistry, Indiana University, 1923; died October 3; aged 55.

Pollner, Edward, Port Richmond, N. Y.; School of Dentistry, University of Pennsylvania, 1927; died December 22; aged 49.

Raff, Nathan, Philadelphia; School of Dentistry, Temple University, 1917; died December 30; aged 58.

Reinert, Fred F., Fort Morgan, Colo.; College of Dentistry, Creighton University, 1907; died November 25; aged 69.

Richardson, William S., Malvern, Ark.; College of Dentistry, University of Tennessee, 1910; died January 13; aged 69.

Rush, Arma E., Washington, D. C.; Dental Department, George Washington University, 1918; died November 22.

Shandel, Bessie L., New York; College of Dental and Oral Surgery, New York, 1916; died November 11.

Shoemaker, Charles G., Kensington, Md.; Dental Department, George Washington University, 1907; died December 6; aged 85.

Singleton, Lawrence S., Seattle; College of Dentistry, University of Southern California, 1929; died November 22; aged 46.

Smith, Hugh I., San Francisco; College of Dentistry, University of California, 1921; died December 24; aged 56.

Snurpus, Forrest H., Evansville, Ind.; School of Dentistry, St. Louis University, 1929; died December 5; aged 46.

Soeder, Francis A., Chicago; Chicago College of Dental Surgery, Loyola University, 1910; died December 29; aged 69.

Soifer, Max E., Hartford, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1922; died January 7; aged 51.

Somers, Harry D., Seattle; School of Dentistry, North Pacific College of Oregon, 1926; died November 29; aged 51.

Spalding, Grace R., Birmingham, Mich.; College of Dental Surgery, University of Michigan, 1904; died January 7; aged 71.

Stalder, Joseph M., Oakland, Calif.; College of Dentistry, University of California, 1898; died September 23; aged 75.

Terry, Richard S., Shreveport, La.; School of Dentistry, Vanderbilt University, 1899; died December 13; aged 75.

Thomas, Howard J., Trenton, N. J.; School of Dentistry, University of Pennsylvania, 1907; died December 29; aged 76.

Thompson, Jesse R., Lincoln, Neb.; College of Dentistry, Creighton University, 1909; died November 28.

Tobiska, Charles M., Crete, Neb.; College of Dentistry, Creighton University, 1911; died November 22.

Werntz, Edward S., Gillette, Wyo.; Chicago College of Dental Surgery, Loyola University, 1909; died August 3; aged 73.

Wetz, Homer F., Highland Falls, N. Y.; School of Dentistry, University of Buffalo, 1925; died December 19; aged 53.

Wild, Raymond E., St. Paul; College of Dentistry, University of Minnesota, 1924; died November 29; aged 56.

Williamson, Theodore P., Charlotte, N. C.; Atlanta Dental College, 1913; died December 4; aged 65.

Wilson, Ralph E., Williams, Iowa; Chicago College of Dental Surgery, Loyola University, 1906; died December 11; aged 77.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois
WHitehall 4-6730

LON W. MORREY, *Editor* JOHN J. HOLLISTER, *Business Manager*

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fourth Annual Session	Sept. 28-Oct. 1, 1953	Cleveland
Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama			F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	July 12-16	Juneau	J. D. Smith	Box 134, Juneau
Arizona			E. M. Scott	17 E. Weldon Ave., Phoenix
Arkansas			D. M. Hamm	White Bldg., Clarksville
California			L. R. Ludwigsen	450 Sutter St., San Francisco
S. California			C. A. Moss	903 Crenshaw Blvd., Los Angeles
Colorado	Oct. 4-7	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 20-23	Hartford	E. S. Arnold	17 Linnard Rd., W. Hartford
Delaware	Jan. 14, 1954	Wilmington	J. C. Baker	Mayfair Apts. Sec. C, 1300 Harrison St., Wilmington
District of Columbia			K. H. Wood	202-1835 Eye St., N. W., Washington
Florida			C. T. Brown	602 Citizens Bldg., Tampa 2
Georgia	Oct. 18-21	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	June 24-27	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho	June 28-July 2	Sun Valley	J. F. Julian	206 Rogers Bldg., Idaho Falls
Illinois	May 12-14	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 18-20	Indianapolis	E. E. Ewbank	Kingman
Iowa	May 4-6	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 10-13	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 5-7, 1954	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana			J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 25-27	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 4-6	Baltimore	E. L. Pessagno, Jr.	19 Medical Arts Bldg., Baltimore 1
Massachusetts	May 3-6	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan			F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 22-24, 1954	St. Paul	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi			H. M. Campbell	102 Professional Bldg., Tupelo
Missouri	May 10-14	Kansas City	E. D. Suggett	201 Merchants Bank Bldg., Jefferson City
Montana	May 7-9	Missoula	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May 11-13	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	May 4, 5	Las Vegas	J. E. Ahlstrom	1150 Arizona, Boulder City
New Hampshire	June 11-14	Bretton Woods	F. E. Williams	814 Elm St., Manchester
New Jersey			J. G. Carr	407 Cooper St., Camden
New Mexico	May 24-27	Albuquerque	J. S. Eilar	Suite 7, Medical Arts Square, Albuquerque
New York	May 12-15	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 17-20	Pinehurst	B. N. Walker	608 Liberty Life Bldg., Charlotte
North Dakota	May 24-27	Fargo	V. B. Keltgen	517 de Lendrecie Bldg., Fargo
Ohio	Nov. 8-11	Columbus	F. G. Jones	185 E. State St., Columbus
Oklahoma			D. Robertson	434 N. W. 13th St., Oklahoma City
Oregon	Mar. 1-3, 1954	Portland	W. F. Gulick	316 S.E. 80th St., Portland
Panama Canal Zone	Dec. 8	Balboa	C. F. Atkins	U. S. Army Hospital, Fort Clayton
Pennsylvania	May 20-22	Atlantic City, N. J.	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			F. Ordonez	1558 Ponce de León Ave., Stop 23, Santurce
Rhode Island			N. G. Migliaccio	1467 Westminster St., Providence

State	Date	Place	Secretary	Address
South Carolina	June 18-24	Caribbean Cruise	J. R. Owings	7 Medical Court, Greenville
South Dakota	May 17-19	Rapid City	E. W. Elmen	Sioux Falls
Tennessee	May 11-14	Knoxville	W. L. McCulley	Brown Bldg., Cleveland
Texas	May 10-14	Houston	W. Ogle	4607 Gaston Ave., Dallas
Utah			K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 17-19	Woodstock	W. J. Reardon	Rutland
Virginia	May 4-6	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 18-20	Yakima	F. J. Dingler	1502 Medical-Dental Bldg., Seattle
West Virginia	July 19-22	White Sulphur Springs	A. B. Drake	506 West Virginia Bldg., Huntington 1
Wisconsin			R. A. Mason	964 N. 27th St., Milwaukee
Wyoming	June 21-24	Laramie	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

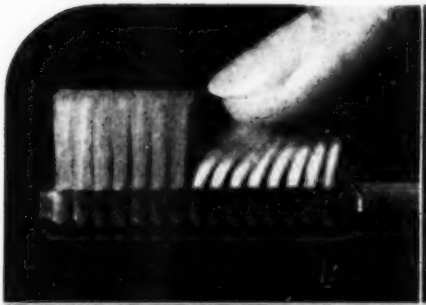
State	Date	Place	Secretary	Address
Alabama	June 15*	Birmingham	N. E. Allen	Du Bose Bldg., Selma
Alaska	July 6-10	Fairbanks	J. H. Geyer	209 Goldstein Bldg., Juneau
Arizona	Aug. 10-15	Florence	R. K. Trueblood	107 East A Ave., Glendale
Arkansas	June 22-26	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California	July 27	San Francisco	K. I. Nesbitt	507 Polk St., San Francisco 2
	June 22	Los Angeles		
Colorado	June 22-26	Denver	C. K. Phillips	724 Republic Bldg., Denver 2
Connecticut	June 15-20	Bridgeport	C. G. Brooks	402 State St., New London
Delaware	June 29-July 1	Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia	June 1-5	Washington	W. T. Birthright	1835 Eye St., N. W., Washington 6
Florida	July 6-14*	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia	June 8	Atlanta	S. H. Yarbrough	12 Medical Arts Bldg., Columbus
Hawaii	Aug. 31, Sept. 1, 5, 6*	Honolulu	H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho	June 24-26	Boise	W. K. Adams	1624 Arlington, Caldwell
Illinois	June 23-26	Chicago	W. A. McKee	503 Wood Bldg., Benton
Indiana	June 16-19*	Indianapolis	C. A. Frech	504 Broadway, Gary
Iowa	May 25-29*	Iowa City	H. M. Willits	719 Roshek Bldg., Dubuque
Kansas	June 1-4	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 8-11	Louisville	R. I. Todd	Western Union Bldg., Richmond
Louisiana	June 1-5	New Orleans	R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine	June 22-25	Boston	R. A. Derbyshire	Box 387, Skowhegan
Maryland	June 8-10	Baltimore	H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts	June 15-19†	Boston	R. A. Barrette	Rm. 33 State House, Boston
	June 17-19‡‡			
Michigan	June 7-13	Ann Arbor	J. L. Champagne	8714 W. McNichols Road, Detroit 21
Minnesota	June 15-19	Minneapolis	F. A. Larson	1632 Washington St., N.E., Minneapolis
Mississippi	June 16-18	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri	June 8, 9, 12, 13	St. Louis	R. R. Rhoades	414 Central Trust Bldg., Jefferson City
	June 10-13	Kansas City		
Montana	July 15-16	Helena	V. J. Quinn	401 Phoenix Bldg., Butte
Nebraska	June 8-13	Lincoln	H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada	June 1	Reno	G. C. Steinmiller	Suite 6, Masonic Temple, P.O. Box 2474, Reno
New Hampshire	June 19, 20	Boston	D. J. Freese	4 Wall St., Concord
New Jersey	June 29, 30**††	Philadelphia	W. A. Wilson	150 E. State St., Trenton 8
	June 17, 18**	New York		
	July 1-3§	Trenton		
New Mexico	June 22-25	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	June 23-26§	New York	D. W. Beier	23 S. Pearl St., Albany 7
		Buffalo		
		Albany		
		Rochester		
		Syracuse		
	June 18, 19**	New York		
		Buffalo		
North Carolina	June 22-26	Chapel Hill	F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 13-17	Fargo	A. B. Crabtree	Ellendale
Ohio	June 18-20§‡	Columbus	H. B. Smith	336 E. State St., Columbus
	June 22-24**			
	June 20††			

State	Date	Place	Secretary	Address
Oklahoma	June 21-24	Oklahoma City	R. P. Keidel	404 Surety Bldg., Muskogee
Oregon	June 15-18*	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania	June 22-24‡‡	Philadelphia and Pittsburgh	A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
	June 25-27**	Philadelphia		
	June 25††	Philadelphia		
Puerto Rico	Sept. §§	San Juan	L. C. Coll	Box 9156, Santurce
Rhode Island	June 15-17	Providence	F. M. Hackett	267 Academy Ave., Providence
South Carolina	July 1-4	Columbia	T. C. Sparks	1315 Pickens St., Columbia
South Dakota	June 21-24	Sioux Falls	H. T. Aker	Canton
Tennessee	June 15-19	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas	June 14-20†	Dallas	R. T. Weber	312 Capital National Bank Bldg., Austin
	June 19, 20‡‡			
Utah	June 26-July 1	Salt Lake City	E. O. Thompson	915 Medical Arts Bldg., Salt Lake City
Vermont	June 22-24	Burlington	F. A. Reid	Windsor
Virginia	June 8, 9‡‡	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
	June 8-11§			
Washington	June 22-26*	Seattle	T. D. Schimke	662 Paulsen Medical and Dental Bldg., Spokane
West Virginia	June 22-24*	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	June 15-19*	Milwaukee	S. F. Donovan	Tomah
Wyoming	June 16	Casper	W. A. Hocker	212 O & S Bldg., Casper

*Dentistry and dental hygiene.
**Dental clinical examinations.
††Dental examinations.
†††Hygiene clinical examinations.
§Dental written examinations.
‡‡Hygienists' examinations.
‡Hygiene written examinations.
§§Indicates approximate dates. These dates should be verified with the State Examining Board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Dental Medicine	June 26-28	Washington, D. C.	W. M. Greenhut Secy.	124 E. 84th St., New York
American Academy of Implant Dentures	Sept. 27	Cleveland	P. S. Loechler Secy.	Dental Corps, Camp Gordon, Ga.
American Association of Dental Examiners	Sept. 25, 26	Cleveland	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Neb.
American Board of Dental Public Health	Sept. 24, 25	Cleveland	P. E. Blackerby, Jr. Secy.	250 Champion St., Battle Creek, Mich.
American College of Dentists	Sept. 27	Cleveland	O. W. Brandhorst Secy.	4952 Maryland Ave., St. Louis
American Dental Assistants Association	Sept. 28-Oct. 1	Cleveland	M. L. Martin Exec. Secy.	410 First National Bank Bldg., LaPorte, Ind.
American Dental Society of Europe	Aug. 4-7	Bergen, Norway	F. D. Derrick Hon. Secy.	140, Park Lane, London W. 1, England
American Denture Society	Sept. 25, 26	Cleveland	A. L. Roberts Secy.	Aurora National Bank Bldg. Aurora, Ill.
Arpa Internationale, Thirteenth Congress	July 13-19	Geneva, Switzerland	J. N. Nally Secy. Gen., Com. on Organization	8, rue de Saussure, Geneva, Switzerland
Berkshire Conference in Periodontology and Oral Pathology	June 14-18	Boston	I. Glickman Dir.	Tufts College Dental School 136 Harrison Ave., Boston 11
Fedération Dentaire Internationale	July 26-Aug. 1	Oslo, Norway	G. H. Leatherman Hon. Secy.	35 Devonshire Place, London W. 1, England
Great Lakes Society of Orthodontists	Nov. 2-4	Grand Rapids, Mich.	C. R. Anderson Secy.	402 Loraine Bldg., Grand Rapids, Mich.
Greater New York Dental Meeting	Dec. 7-11	New York	M. Purdy Exec. Secy.	Hotel Statler, Room 106A, New York
International Academy of Anesthesiology	May 14	Washington, D. C.	I. G. Tomack Exec. Secy.	355 E. 149th St., New York
National Board of Dental Examiners	Dec. 7, 8		G. J. Casey Secy.	222 E. Superior St., Chicago 11
New England Dental Society	Oct. 21, 22	Boston	F. L. Finley, Jr. Secy.	43 Farmington Ave., Hartford, Conn.
Southern Society of Orthodontists	Nov. 1-4	Orlando, Fla.	M. D. Edwards Secy.	132 Adams Ave., Montgomery, Ala.
Thirteenth Australian Dental Congress	June 1-5	Brisbane	A. H. Jackson Secy.	New Zealand Chambers, 334 Queen St., Brisbane, Australia



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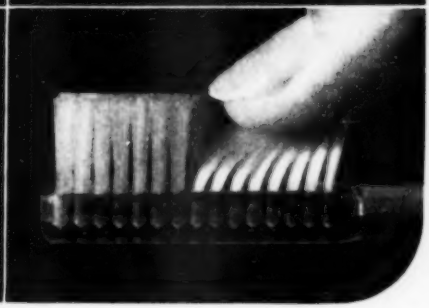

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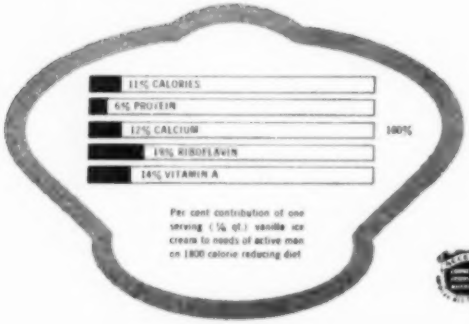
11% CALORIES
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100%
Per cent contribution of one serving (⅛ qt.) vanilla ice cream to needs of active man on 1800 calorie reducing diet

A reducing diet can have taste appeal and be effective, too.

In recent studies on weight reduction, ice cream was included with other dairy foods in meals supplying 1800 calories a day.[1] Strict adherence to such diets allowed gradual weight loss by larger women and by men whose calories did not need to be restricted excessively.

These diets contained approximately equal weights of protein, fat, and carbohydrate.[1] Fat combined with protein in a meal delays hunger—both that caused by emptiness of the stomach and by low blood sugar levels—for it reduces stomach motility and gastric juice secretion, promotes slower digestion and more gradual absorption of nutrients. Subjects on such diets maintained pep and a sense of well-being, reported no hunger pangs—but shed excess pounds.[1]

An average serving of vanilla ice cream provides only one-tenth of the calories in such a diet, but supplies one-fifth of the riboflavin need and somewhat more than one-tenth of the need for calcium and vitamin A.[2] Ice cream also supplies the high grade protein and other important nutrients found in milk.

Ice cream, a "morale booster" can go a long way to prevent the martyred feeling of the reducer.

[1]Weight Reduction Through Diet. A documentary motion picture produced in 1951. National Dairy Council.

[2]Dahlberg, A. C. and Loosli, J. K.: Nutritive value of commercial ice cream. J. Am. Diet. Assn. *24*:20 (Jan.) 1948.

This seal indicates that all nutrition statements in the advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

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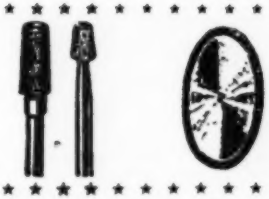

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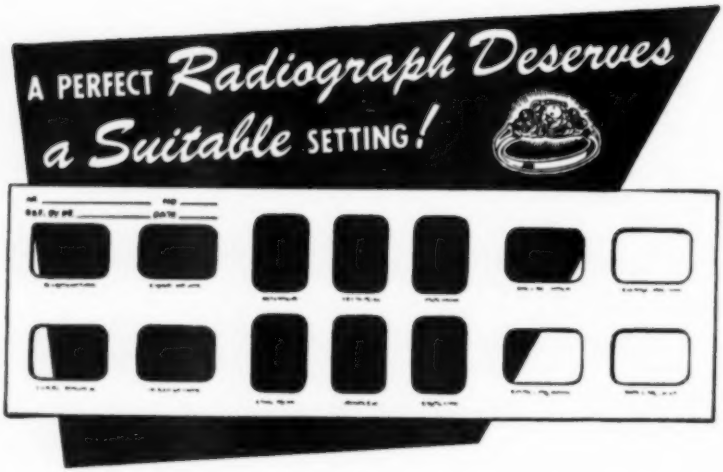

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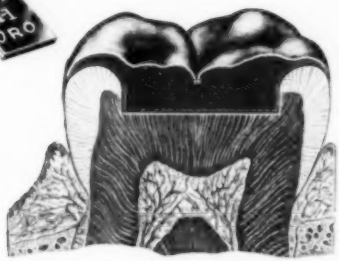

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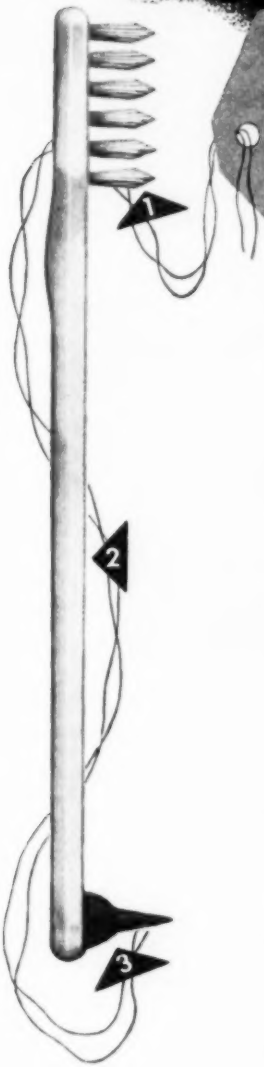

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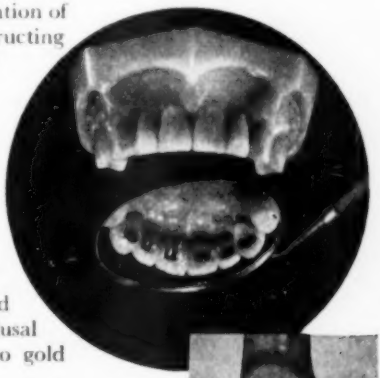

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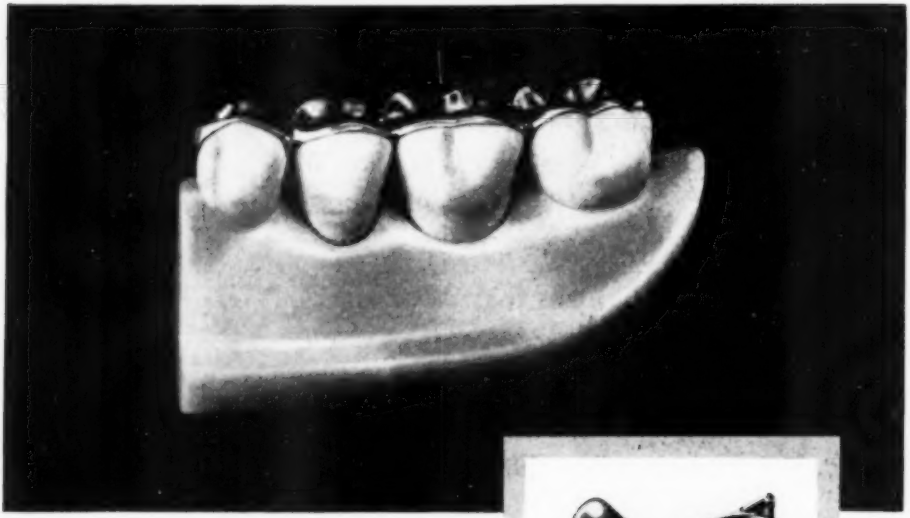

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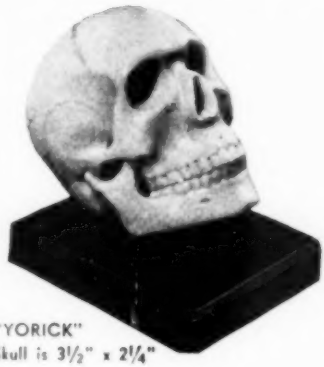

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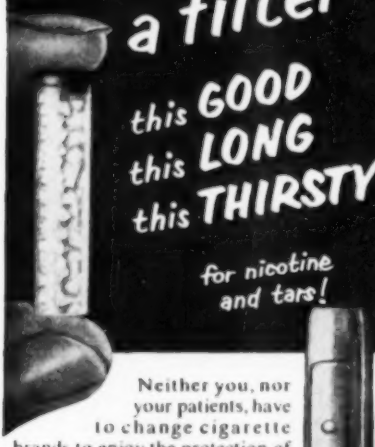

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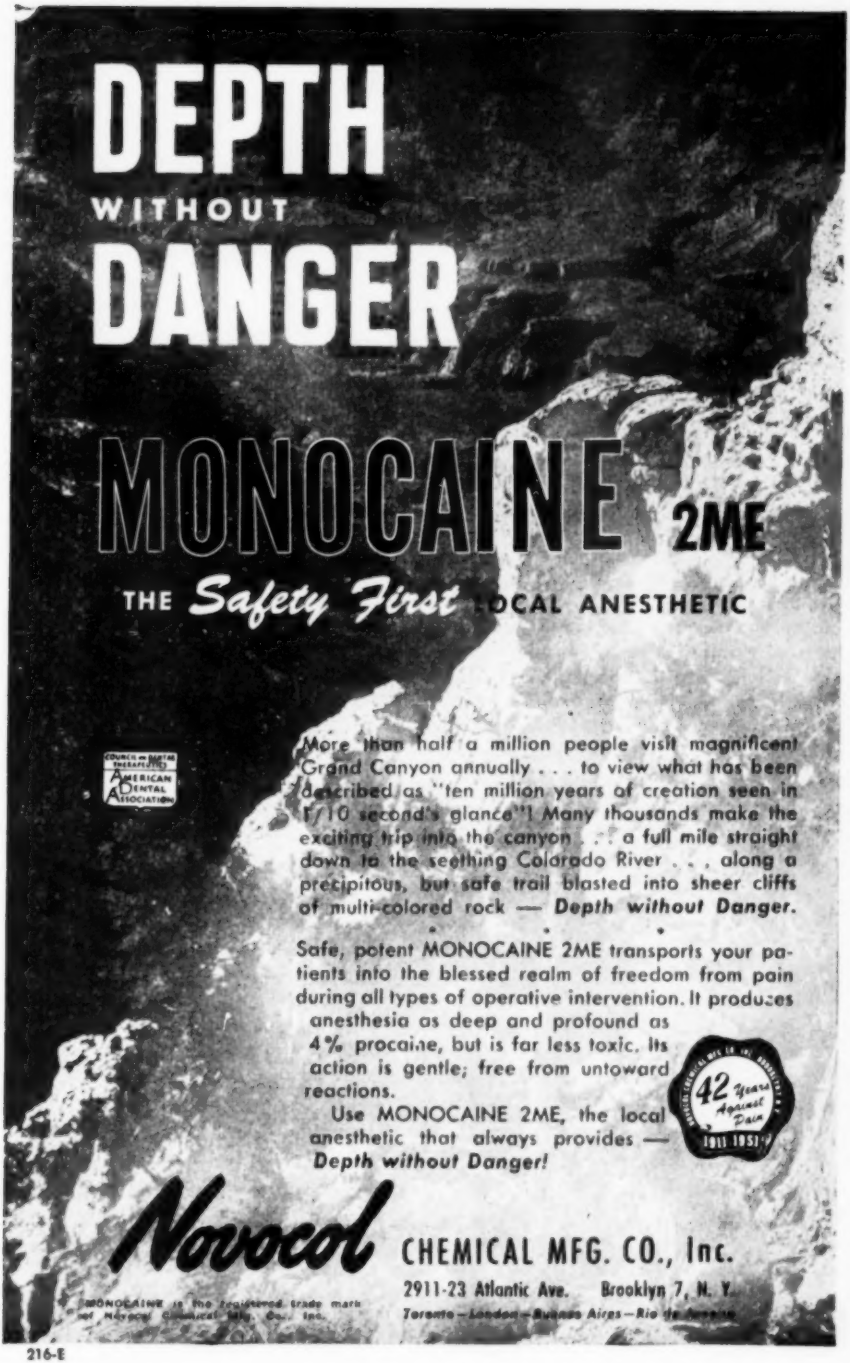
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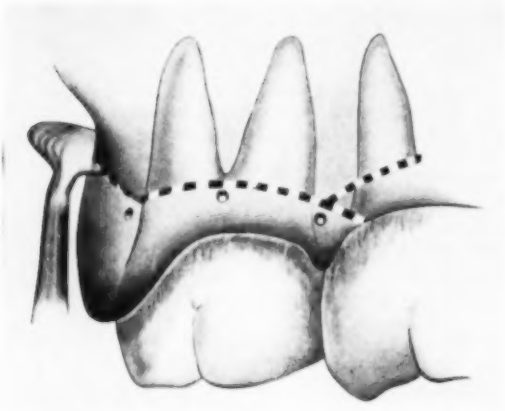

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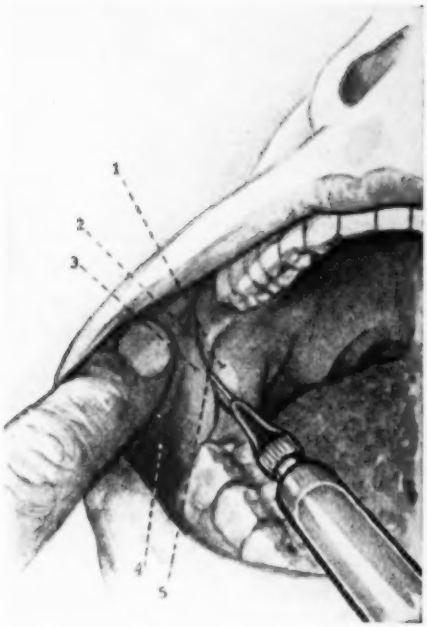

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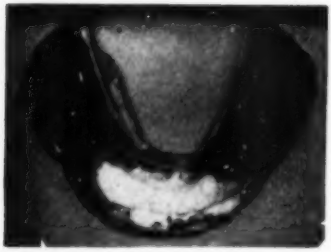

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MASSACHUSETTS—On Cape Cod. Dental office in town drawing from population of about 5,000. Original model Cape Cod cottage with connected office on most exclusive street; 9 rooms, 2-car garage, ½ acre land and modern heat. Office and home furnishings complete. No dentist in town. Owner retiring. Direct replies to Dr. Lester Parker, Box 37, Sandwich, Mass.

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NEW YORK—Long Island, 75 miles out. Substantial pre-war home, 10 rooms, 2½ baths, automatic heat, slate roof, double garage, 8-room office bungalow, two chairs, Ritter units; long established. $40,000; half cash, balance 20 years. Address A.D.A. Box No. 443.

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NEW YORK—Well established, profitable general practice. Six-room office, seven-room home combination; separate entrances; sound proofed. Will stay on for short period. Located on Staten Island. Address A.D.A. Box No. 339.

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OHIO—Columbus. Established practice. Ultra-modern two-chair office. Airdent, gas, S.S.W. equipment. Located in Medical Center. Grosses over $30,000. Leaving state because of health. Direct replies to Box 1894, Columbus 16, O.

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OREGON—For sale or lease. New two-chair dental office in new air-conditioned professional building in Grants Pass. Part of beautiful Rogue River Valley in southern Oregon. Owner in service. Direct replies to Dr. N. B. Wright, 2809A Westhaven Circle, Amarillo, Tex.

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WEST VIRGINIA—One-chair office. Ritter X-Ray, equipment. In heart of richest coal field in West Virginia. Established practice, 28 years. Retiring. Good opportunity for small investment. Direct replies to Dr. W. W. Pollock, Box 97, Mullens, W. Va.

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ARIZONA—Wanted: Dentist with Arizona license to take over established general practice in Phoenix while I am in service. Completely equipped, modern two-chair bungalow office. Direct replies to Box 541, Phoenix, Ariz.

FLORIDA—West Coast, associate, age 26 to 35. General practice, surgery and general anesthesia necessary. Give full details as to professional background and military status. Address A.D.A. Box No. 444.

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IDAHO—Wanted: Dentist to locate at Cottonwood. Population of town and surrounding service area 4500. Benedictine Sisters Hospital, Catholic Elementary and High School and Public Elementary and High School. Direct replies to Carl Schmidt, Chamber of Commerce, Cottonwood, Ida.

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KANSAS—Dentist under 40 for employment in school for mentally and physically handicapped. Good working facilities, excellent program. Must have license or qualify as intern. Salary $4,860.00. Send particulars and photograph to Superintendent, State Training School, Winfield, Kans.

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MARYLAND—Dental hygienist, Maryland licensed, for highly desirable private practice in modern office. $70.00 weekly to start. Three weeks vacation with pay. Address A.D.A. Box No. 445.

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MASSACHUSETTS—Associate wanted for well established general practitioner in eastern Mass. Must be free from military service, about 3-5 years' experience, good exodontist, Mass. registered. Excellent opportunity for the right man. Give age and professional background. Address A.D.A. Box No. 446.

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NEW YORK—Priority three dentist may enter service shortly. Would like replacement to run office in small central New York village for two years. Address A.D.A. Box No. 447.

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OHIO—Dentist. Due to death of former associate with me 12 years, urgently require permanent associate for downtown Dayton practice. Substantial salary and also commission. Direct replies to Dr. J. H. Boyles, 139 S. Main St., Dayton, O. Telephone Michigan 0393.

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OHIO—Excellent opportunity for young man desiring partnership in well-established practice. Must have Ohio license. State age, experience, draft status. Direct replies to Dr. R. L. Bolte, Oak Harbor, O.

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OHIO—Wanted: Dentist to associate with group of physicians in a small Ohio city. Address A.D.A. Box No. 215.

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OKLAHOMA—Wanted: Dental hygienist to work with two dentists in medium sized town. Financial arrangement very attractive. Address A.D.A. Box No. 448.

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DENTIST—Recent graduate; willing to maintain practice of dentist leaving for Military Service on percentage basis. Will sign firm agreement not to compete later. St. Louis, Mo. area only. Make offer. Address A.D.A. Box No. 335.

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YOUNG ORTHODONTIST—California license, military service completed, candidate for Master's Degree in Orthodontics, interested in part-time or full-time association in southern Calif. Address A.D.A. Box No. 451.

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1951 Texas University graduate returning from 24 months' Army duty in July, 1953. Interested in association, with option to purchase, or purchasing practice in Houston, Tex. Address A.D.A. Box No. 452.

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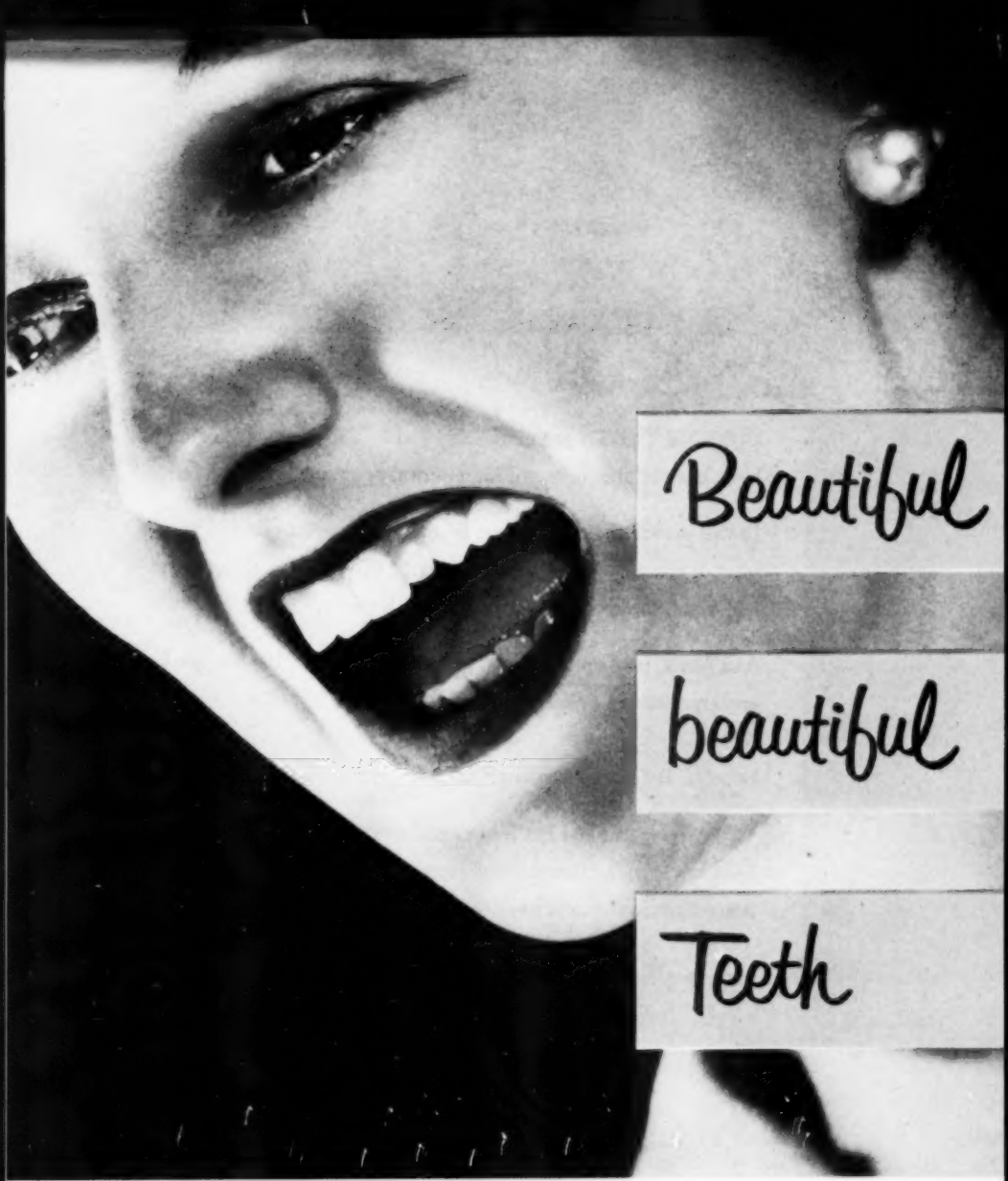

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- ★ The Professional Aid Kit, as illustrated, will enable you to demonstrate some of the important features of the All Luxene Denture.

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This illustration shows the doctor demonstrating the toughness test to the patient.

This illustration shows the patient making the toughness test for herself.

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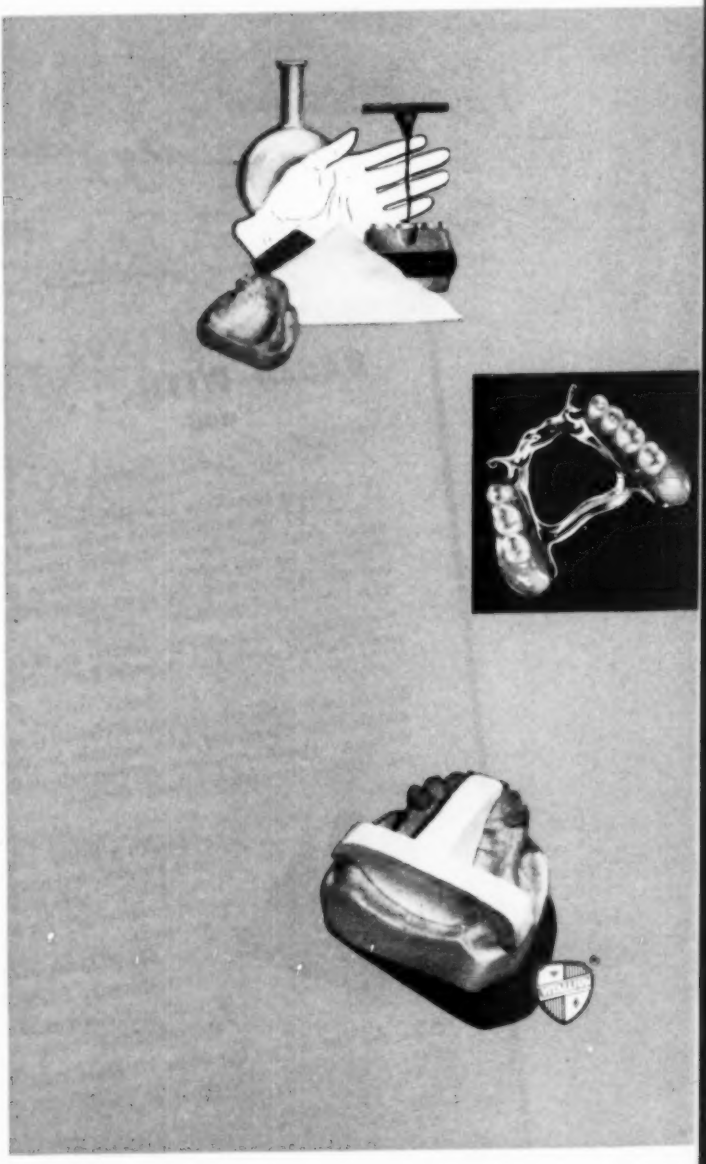

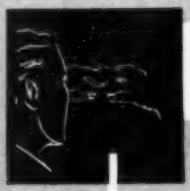

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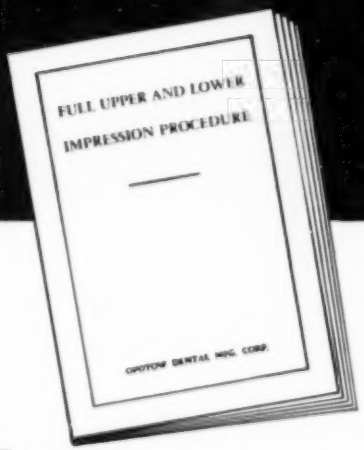

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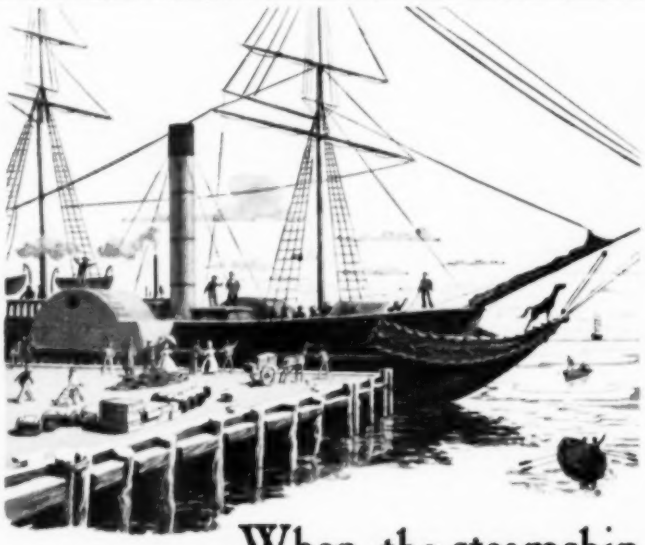

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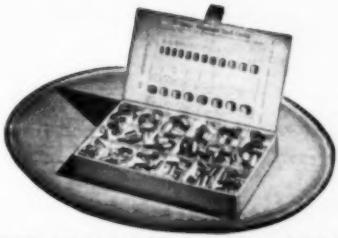

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3	Auditorium	4.50- 8.00	7.00- 11.00
4	Belmont	3.25- 4.25	5.75- 7.50*
5	Bolton Square	3.50- 5.00	6.50- 8.00
6	Carter	4.50- 8.00	7.00- 12.50
7	Cleveland	5.00- 10.00	8.50- 15.00
8	Commodore	6.50- 10.00	8.50- 12.00
9	Fenway Hall	6.00- 6.50	8.50- 10.00
10	Hollenden	4.50- 8.00	7.00- 16.00
11	Lake Shore	5.00- 8.00	9.00- up
12	New Amsterdam	3.00- 4.00	5.50- 7.00
13	Olmsted	$4.25- $8.00	$7.00-$10.00
14	Park Lane Villa	5.50- 6.00	7.00- 8.00*
15	Quad Hall	3.00- 6.00	6.00- 10.00
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17	Sovereign	5.00- 7.00	7.00- 9.00
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19	Stockbridge	4.00- up	6.00- up *
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Hotel reservation application

94th Annual Session
American Dental Association
Sept. 28—Oct. 1, 1953
Cleveland, Ohio

INSTRUCTIONS: Reservations for hotel accommodations may be secured by completing this application and mailing it to: A.D.A. Housing Bureau, 511 Terminal Tower, Cleveland 13, Ohio.

Be sure to indicate your arrival time in Cleveland. Reservations will be held only until 6 p.m. of the day you indicate when you will arrive in Cleveland. Failure to notify the hotel of any last minute change in your arrival time may result in cancellation of the reservation.

Names of all persons who intend to occupy the accommodations must be listed on the application.

List four choices of hotels. Confirmation will be sent to the applicant indicating which hotel has accepted the reservation.

Write the A.D.A. Housing Bureau in Cleveland if you wish to cancel the reservation.

A.D.A. Housing Bureau • 511 Terminal Tower, Cleveland 13, Ohio

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Applicant:

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Arrival in Cleveland_____ a.m. / p.m. Leaving_____

Accommodations:

Hotel_____ (First choice) Hotel_____ (Third choice)

Hotel_____ (Second choice) Hotel_____ (Fourth choice)

☐ Single occupancy, rate to range from $_____ to $_____ per day

☐ Double occupancy, double bed, rate to range from $_____ to $_____ per day. } 2 names must be listed below

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☐ Suite of_____ rooms, including parlor, rate to range from $_____ to $_____ per day.

Occupants: (use an extra page for listing additional names if necessary)

Room will be occupied by:

_____
(Name) (Address) (City) (State)

_____
(Name) (Address) (City) (State)

ASSOCIATION PLAN

Accident and Health Insurance

THIS IS THE ONLY PLAN OF ACCIDENT AND HEALTH INSURANCE ENDORSED OR APPROVED BY THE AMERICAN DENTAL ASSOCIATION

★★★★

BRIEF OUTLINE OF COVERAGE

Accident Benefits —Full monthly benefit for total disability, from FIRST DAY, limit 60 months. **One-half monthly benefit for partial disability, limit 6 months.** Limit of time for total and partial combined 60 months.

Sickness Benefits —Full monthly benefit for total disability commencing with Eighth day of disability, limit 24 months, **house confinement not required.**

Individual Termination —The insurance of each insured member will continue in force concurrently with the group policy and may only be terminated by reason of any of the following conditions:

a. If the group policy is terminated.

b. If the insured member fails to pay the required premium.

c. If the insured member ceases to be a member of the American Dental Association

d. If the insured member retires or ceases to be actively engaged in the dental profession.

★★★★

PREMIUM RATES

(Applicable to ages at entry and attained at annual renewal of insurance)

			SEMI-ANNUAL RATES		
Monthly Benefits	**Accidental Death Benefit**	**Dismemberment Benefits**	**Ages Up To 50**	**Ages 50 to 60**	**Ages** 60 to 65**
$100.00	$3,000.00	$ 5,000.00	$16.05	$18.30	$22.80
$200.00	3,000.00	10,000.00	30.15	34.65	43.65
$300.00	3,000.00	15,000.00	44.25	51.00	64.50
$400.00	3,000.00	20,000.00	58.35	67.35	85.35

Premiums will be billed half-yearly.

**Although the age limit for acceptance of risks is the 65th birthday, once issued, there is no termination age limit for renewal.

If you are not now insured under the ASSOCIATION PLAN, communicate with the Trustee of the Policy Dr. Paul W. Zillmann, 29 Walden Avenue, Buffalo 11, N. Y., or with M. A. Gesner Inc. 150 East Superior St., Chicago 11, Ill.

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NATIONAL CASUALTY COMPANY of Detroit

Through

M. A. GESNER INC.

150 East Superior Street **WHitehall 3-1525** **Chicago 11, Ill.**

Since the National Casualty Company's plan of accident and health insurance is now in effect in New York, New Jersey, California, Utah and Nevada, the Association Plan is not available in those states.

CHEMICALLY DIFFERENT from any other material ever used in dentistry

In Jeltrate, Caulk research has developed an alginate powder so easy to use, so accurate, and so stable that it revolutionizes the process of impression taking. Here is an impression material that offers every single characteristic dentists and laboratories alike have hoped for!

BULK PACKAGED for unusual economy Jeltrate requires no individual packaging to protect manipulative characteristics. It is packed in a large can, containing powder for 17 large impressions, or approximately 25 average impressions with lowers and partials included.

CHEMICAL STABILITY for unlimited periods Jeltrate is the one alginate that remains completely satisfactory regardless of prolonged exposure. Setting time does *not* accelerate with age.

EXCEPTIONALLY EASY to measure and mix Powder is simply scooped out of the can and mixed with water at room temperature. The mass quickly becomes smooth and creamy. Powder-water ratio is not severely critical.

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WERNET'S DENTU-CREME AND

Comb A MINK COAT?

Hardly! The precious pelts must be cleaned with the greatest of care, lest their delicate beauty and integrity be irreparably marred. Dentures, too—costly and frangible products of prosthodontic art—may be forever ruined by carelessly chosen cleansers. Give your patients added denture protection by telling them about Wernet's Dentu-Creme and Wernet's Plate Brush. Dentu-Creme is smooth, absolutely non-injurious, and an excellent detergent. The special polishing agent it contains makes it ideal for use on acrylics. Wernet's Plate Brush with the Easy Grip Handle, conforms to professional specifications. Its divided tufts of fine bristles are individually wired-in for long life. Its black bristle section is used on the ridge and the vault—its white bristle section on the teeth and interproximal surfaces. For safe, yet thorough removal of mucin plaques, food particles and stubborn stains, suggest Wernet's Plate Brush and Wernet's Dentu-Creme!

WERNET DENTAL MANUFACTURING COMPANY, INC.
Jersey City 2, N. J.

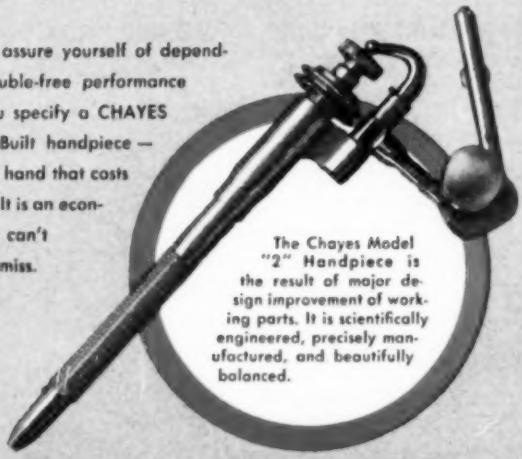
11-E

WERNET'S PLATE BRUSH

YOUR "THIRD" HAND IS YOUR HANDPIECE, DOCTOR!

A dental handpiece is too often a taken-for-granted piece of equipment. Yet, it is really your "third" hand — for through this indispensable instrument your studiously acquired operating skills are brought into play. Since your patient renders a verdict on your professional skill, based on the performance of your handpiece in your hands, this instrument should function perfectly *at all times!*

You can assure yourself of dependable, trouble-free performance when you specify a CHAYES Precision-Built handpiece — a "third" hand that costs but little. It is an economy you can't afford to miss.



The Chayes Model "2" Handpiece is the result of major design improvement of working parts. It is scientifically engineered, precisely manufactured, and beautifully balanced.

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Control of infection in the mouth is often possible only through the use of an agent active over the entire range of the oral flora.

AUREOMYCIN

Hydrochloride Crystalline Lederle

is such an agent. It is eminently successful, both therapeutically as an adjunct to recognized dental procedures, and prophylactically in dental surgery. Oral administration of Aureomycin in capsules provides effective levels throughout tissues and body fluids. This versatile antibiotic is also supplied in forms specially designed for treatment of various surface lesions, and for use in conjunction with systemic therapy.

A booklet on the use of Aureomycin for infections of the oral cavity is available on request.

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DENTAL CONES (5 mg.)—tubes of 12.

DENTAL PASTE (30 mg. per Gm.)—jars of 5 Gm.

DENTAL OINTMENT 3% (30 mg. per Gm.)—¼ ounce applicator tube.

The above Aureomycin products are available through your dental supply dealer.

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in a Practical multi-use container

Contains True Dentalloy and Filling Porcelain Improved, as follows:

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1 each Filling Porcelain Improved powders Nos. 20, 22, 26, A, and E
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Packed in an attractive zipper case, lined to resist moisture and stain

VALUE $49.00..... Price $40.00

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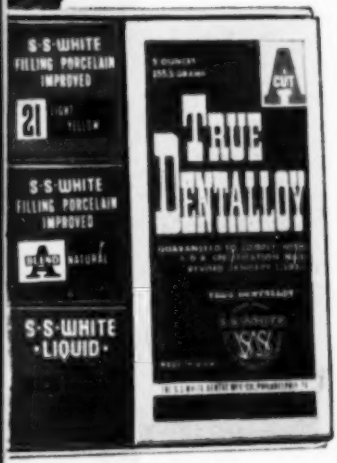

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Has more than enough strength to withstand masticatory stresses, even in large cavites. It has high resistance to oral fluids and there is no recurrence of decay in cavities filled with it. Filling Porcelain Improved restorations are life-like and enduring.

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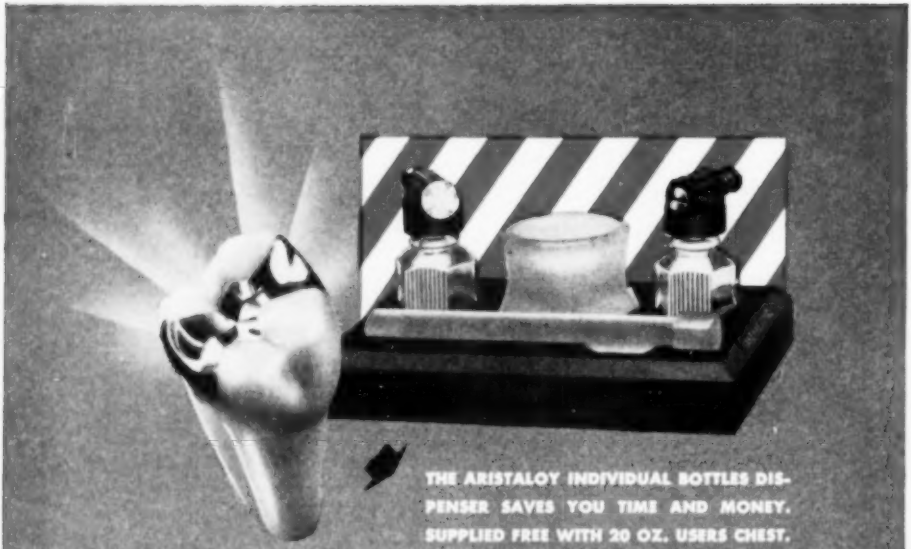

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It is sound practice to use your skill only with the finest, proven materials. This is particularly true in the case of amalgam fillings.

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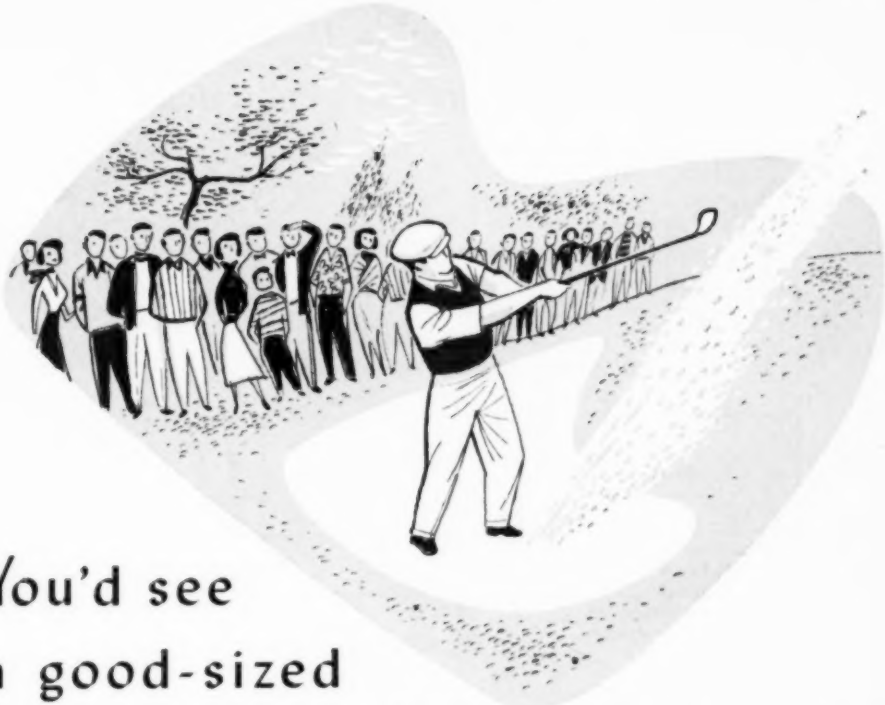

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4. *In equal oral doses, no other barbiturate combines quicker, briefer, more profound effect.*

Perhaps that's why—after 23 years, 598 published reports and more than 44 clinical uses—you'll find more and more prescriptions call for NEMBUTAL.

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For Penicillin Therapy in Dental Practice
just 1 or 2 tablets three times daily

Pentids

Squibb 200,000 Unit Penicillin Tablets

Efficacy of Antibacterial Agents against Various Organisms in Oral Cavity

Organism	Sulfonamides	Penicillin	Streptomycin or Dihydrostreptomycin	Aureomycin or Terramycin	Chloramphenicol
Hemolytic streptococci					
Group A	B	A		B	B
Group D		A—combine—A		B	C
Other Groups		A		B	B
Streptococcus viridans		A		B	
Staphylococcus	B	A	B	A	B
Pneumococcus	B	A		B	B
C. diphtheriae		A		B	B
Vincent's organisms					
Borrelia vincentii		A		B	B
Fusiformis dentium		A		B	B

A—Drug of choice B—Effective C—Moderately effective, some activity

For treatment of acute oral Vincent's disease as an adjunct to other appropriate dental procedures, and for prophylaxis against secondary infection before and after extraction and other dental surgery. When pre-existing cardiac lesions predispose to subacute bacterial endocarditis or there is extensive tissue trauma, parenteral penicillin should be given before or at time of extraction followed by Pentids therapy postoperatively.

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1. KEEFER, C. S., POSTGRAD. MED. 9:101, FEB. 1951. 2. FLIPPIN, H. F., AND ISRAEL, H. L., MED. CLIN. NORTH AMER. 34:1053, NOV. 1950.

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***F**ine grain*
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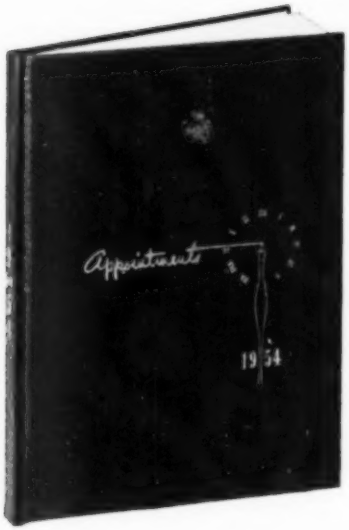

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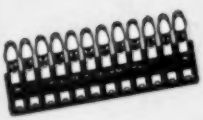

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